Pit and Quarry

SAND - GRAVEL - STONE
CEMENT - LIME - GYPSUM

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Pit and Quarry

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Vol. 12 CHICAGO, ILL., AUGUST 18, 1926 No. 10

FEATURE CONTENTS

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WORKMEN'S COMPENSATION

INTEREST in the problem of compensation legislation for workmen in hazardous occupations has increased in volume and extent in this country during the last few years. The question of workmen's compensation concerns everyone who is connected with industry. It is being considered from all angles so that future regulations and adjustments may be made with the best results. It is a comparatively new subject having developed within the first quarter of the twentieth century. The next decade will undoubtedly bring changes leading to a fair degree of standardization. All phases of the subject lead to the conclusion that it is practicable and in harmony with sound economic principles.

Workmen's compensation may be defined as the indemnification of the employee for loss sustained because of bodily injury or death resulting from his employment. The theory is based on the belief that accidents during work frequently arise from prevailing and often unavoidable risks inherent in the nature of modern production. The economic consequences of these injuries should be borne by the industry in which they are sustained and by society for whose service they occur, as well as by the workman who suffers from the injury. The employer thus assumes responsibility for loss in human beings just as he does for loss in equipment. Hence, the obligation should be estimated in with the cost of operation and not charged to the producer. Employer and employee are partners in success or failure; their welfare is dependent on the same forces and governed by the same principles. The entire burden cannot be thrown on one or on the other; nor can permanent benefits fall on one and not on the other. The use of mechanical appliances in all employments results in an element of danger which did not exist in the past. This danger in many cases cannot be eliminated, but rather becomes greater with the addition of new devices for increasing production. Under these conditions the worker is exposed to injuries which are not attributable to him or to his employer. Unavoidable accidents, therefore, should be a burden to the employment in which they occur.

It is acknowledged that under the old method there was little possibility of satisfactory adjustment for loss on the part of the employee. If a workman sued his employer, he was faced with almost insurmountable obstacles. His suit was barred if the injury was due in any way to his own negligence or to the negligence of another employee. In other words, the worker was forced to assume all ordinary risks. He was also obliged to assume the burden of proof in establishing a charge of negligence on the part of the employer. This became increasingly difficult, in fact impossible, as industry became complicated and the employer more remote and inaccessible. In case of a workman's death there was no redress because action had to be a personal one. Hence, a workman received little consideration when indemnification came through his own efforts. He was frequently worse off because of his efforts inasmuch as bad feeling would result from his attempt to force his employer to meet his claim. Litigation in connection with claims is sure to cause waste, delay, and bitterness, all harmful to industry and hence bad economy.

Before the present compensation method came into existence, there was some effort made to modify the old system. Some of the employer's defences were taken from him in an attempt to improve the situation for the employee. Expenses for settlement in court, however, were burdensome both to the workman and to the employer, and the entire proceeding was unsatisfactory. This was the situation at the opening of this century. The first American compensation statute was passed in 1902 in Maryland and was promptly declared unconstitutional on the ground that it deprived the parties concerned of the right of trial by jury. The administration of the law had been left in the hands of the state insurance commissioner. This law applied to mining, quarrying, railways, and municipal construction work. While the effort was unsuccessful, the idea of a better method of dealing with the problem had not been destroyed. In 1908 the Federal Government provided for compensation for accidents in certain dangerous occupations. In 1910 New York passed a compensation law making indemnification for hazardous occupations compulsory, and for others, optional. The law did not go into effect until 1914 because of the necessity of amending the state constitution. Within six years forty-two states and three territories had compensation laws. Certain non-hazardous occupations such as agriculture, domestic service, and public service are not included. In several states disability arising from occupational disease is included.

Invariably associated with compensation for injury is the problem of accident prevention. It is estimated that the loss of earning power due to accidents in the United States in 1917 was $1,117,790,000. This covered 28,000 deaths and 3,877,000 injuries. Such statistics show the economic necessity of preventing accidents. Some of our inventive genius is now directed toward the problem of safety devices. Protection of workers from occupational disease has increased. Such efforts create a feeling of good will which is a valuable asset. Many companies have voluntarily established systems of workers' relief which have been satisfactory. Such concerns have been actuated by motives of fairness and wisdom, and by considerations of economy. They have assumed that every accident upon their premises creates a presumption against them, and that it is to their best interests to make compensation more generous and adequate than that required by law.

THE PRESENT STATUS OF BUILDING

PRODUCERS of non-metallic minerals are concerned with the status of realty activity throughout the United States. The present real estate market is analyzed in the semi-annual survey of the National Association of Real Estate Boards from data assembled from reports of real estate boards of 181 cities. This report indicates a large degree of fluctuation in various parts of the country and in various types of building. Returns from 40 per cent of the district boards reporting indicate a more active market than at this time last year; 38 per cent of cities under 25,000, and 25 per cent of cities between 200,000 and 500,000 also report greater activity. Sixty-seven per cent of the cities over 500,000 show that the market has fallen off as compared with conditions a year ago.

A comparison of the number of transfers and conveyances recorded from month to month is also made by the National Association of Real Estate Boards. An index figure is determined which represents the average number of transfers and conveyances recorded in relation to the average number recorded during the same month during a period from 1916 to 1923. The index for May of this year was 163, which means that the average number was 63 per cent greater than during the period mentioned above which is taken as a norm. The index of each month of 1926 has been high, ranging from 184 in January down to 163 in May. The index figures for 1926 have been higher than those for 1925 except in the months of April and May. Forty-two per cent of all boards reporting show a less active market than that of last year; 28 per cent report the same activity; and 30 per cent indicate greater activity. Reports of a falling off in activity come from states in the southeastern part of the country; reports of a more active market come from the Pacific coast states and from Canada.

Increase in overbuilding is reported from many places. Seventy-four cities show a condition of over building in some form of structure. Thirty-eight cities report over building of single family dwellings; 42 cities report over building of apartments; 36 cities, of business buildings; and 8 cities report over building of all types. Only 17 per cent of the reports show a shortage of single family dwellings; 15 per cent a shortage of apartments; and 12 per cent a shortage of business structures. Last December these percentages were 36, 33, and 34 respectively. These figures indicate that build-programs have caught up with demand in many sections of the country. In the southeastern states, however, this is not the case. Of the reports from this section, 63 per cent show a shortage of single family dwellings; 61 per cent show a shortage of apartments; and 69 per cent, of business buildings.

IMPROVING HEALTH INCREASES PRODUCTION

INCREASED production is the aim of all business enterprise today. The best intellects in every organization are at work on this problem. "Maximum Production" is the slogan of the twentieth century. To secure maximum production executives are looking for the most up-to-date equipment; they are rebuilding or remodeling their plants; they are studying methods of handling labor most advantageously. They are reducing labor turnover and useless loss of time and money. They are handling the problem of production with the utmost intelligence, based on scientific principles. A significant phase of this tendency toward efficiency and scientific management is the emphasis which is being placed on the question of health. It is hopeful for the future of our civilization that experts agree that health is a paying proposition.

There are about thirty-five million industrial workers in the United States. Statistics show that an average of about eight days' wages are lost per year by each of these workers because of sickness. With $3.00 a day taken as an average wage this means more than eight hundred million dollars. If the workers lose millions, the loss in terms of production must be estimated in terms of billions. Billions of dollars lost because of sickness on the part of the workers!

HYDRAULIC METHODS APPLIED EFFICIENTLY BY BUILDING MATERIALS CORPORATION

By George Ransom

THE Building Materials Corporation of 300 Madison Avenue, New York City, has a plant near New Brunswick, New Jersey, where sand and gravel are obtained by hydraulic methods with about as great a degree of efficiency as anybody could reasonably hope to attain. The gravel pit is located about 3,000 feet from the plant. The mixed sand and gravel is sluiced down from the pit by a Georgia Iron Works "gun" operating under about one hundred pounds pressure and flows with the water to a sump pit from which it is pumped through a ten inch pipe to the plant. The means by which this is accomplished are simple enough when seen in operation but this simplicity is not an accident. It is well worth studying, and both Mr. T. G. Meadows, the engineer in charge, and the Georgia Iron Works, which has cooperated with him in making the installation, deserve much credit.

Water for the guns is supplied from a small pond made by damming a stream about a quarter of a mile from the pit. A Manistee centrifugal pump with a capacity of 2,400 gallons per minute and driven by a 50 h.p. Ideal Electric Company induction motor is located at this pond. This outfit pumps the water at rather a low pressure to a booster pump located near the sump pit. The booster pump is an 1,800 gallon centrifugal pump

Pump House at Pond Created by Gun

The Sand and Gravel Pump

General View of Gun with Sump in Middle Background

but in this case it is driven by a 100 h.p. Ideal Electric Company induction motor and builds the pressure up to 100 pounds. This is sufficient to wash down the sand and gravel in this location as it is not as tightly packed as sometimes occurs in other places.

From the sump pit the mixture of sand, gravel and water is pumped by a Georgia Iron Works centrifugal pump at the rate of about 150 tons of sand and gravel per hour. It is driven by a 150 h.p. General Electric variable speed induction motor. The rise from the pump, which is located in the pit, to the highest point above is only about 30 feet and from there on for a distance of over a quarter of of a mile, there is an almost continuous gentle slope downwards to the plant which is situated on the banks of the Raritan River. Consequently this one pump is sufficient to keep up an adequate flow of material. Formerly there was another centrifugal pump about midway between the pit and the plant intended to act as a booster but this is not now operated because it was found that by running the remaining pump in the pit a little faster the flow could be kept up with only slight diminution. Therefore, unless the demand for output increases materially the use of the boster pump will be discontinued with a resultant economy. The illustrations give an idea of the arrangement of pipes, valves, and flexible connections. All of these fittings were furnished by the Georgia Iron Works.

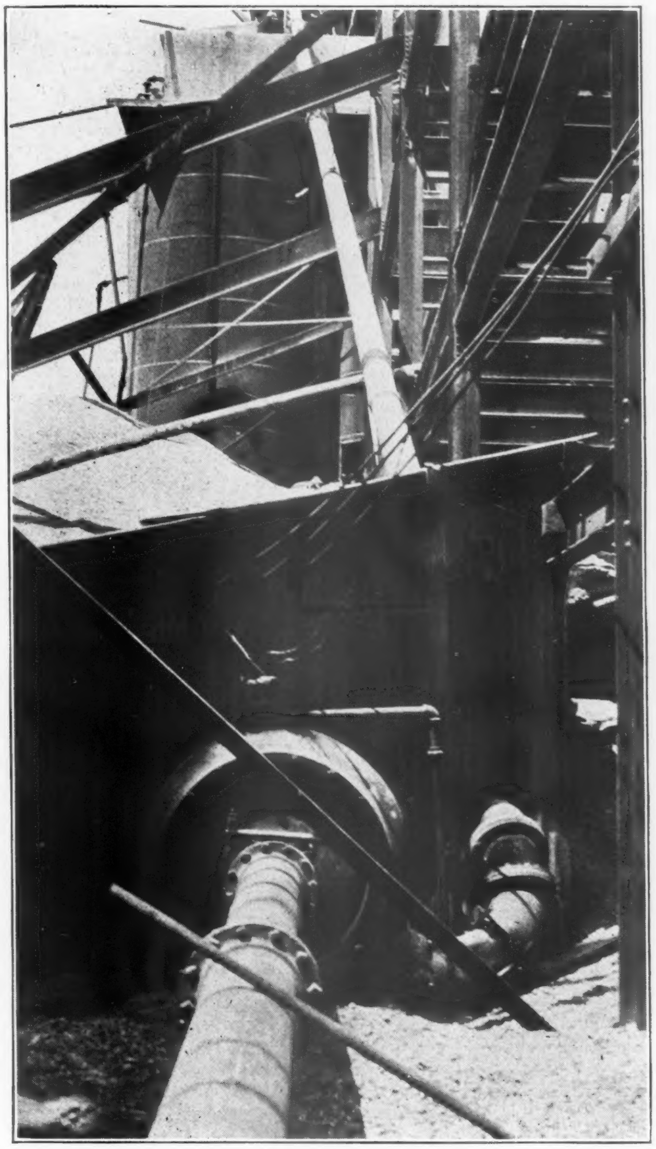
Probably the most unique, as well as the most radical, feature of this installation as compared with ordinary hydraulic methods, is the arrangement of the pipe and valves by which the high pressure water can be quickly utilized to keep the sand

Upper Left Shows Motor Truck Loading Under Steel Bins. Lower Shows Pump House and Jet Operating Against Bank line discharging at full capacity at all times by instantly relieving any tendency of the sand or gravel to accumulate in the line. This no doubt accounts for the large capacity of the installation and is one of those extremely important small details which first-class designers take care of and indifferent ones neglect and which make the difference between conspicuous success and just getting by.

Only three men are required in the pit. This includes the foreman, the man who operates the "gun" and a man who tends the sump pit to pick out stones larger than about 6 inches in diameter which may be washed down. There are two guns in the pit but the second has so far only been used occasionally as an auxilary, as one has so far given the required production.

The plant itself was originally the site of a potash company which has been successfully reorganized. A considerable amount of the equipment is made use of, particularly a power plant and a large Gantry crane on the river bank. Sand lime brick is made here and preparations are under way to burn lime but these are described later in this article.

At the plant the mixture of sand and gravel is pumped from the ground up seventy-five feet to the receiving tank at the top by a pump similar to that at the pit. The material enters the bottom of the receiving tank only at a moderate pressure. A baffle plate is placed at angle over the entrance against which the mixture strikes. The fine sand is carried over the top of the baffle by the now rather gentle current of water, settles on the upper side of it and flows out through an opening near the bottom into a settling tank whence it passes

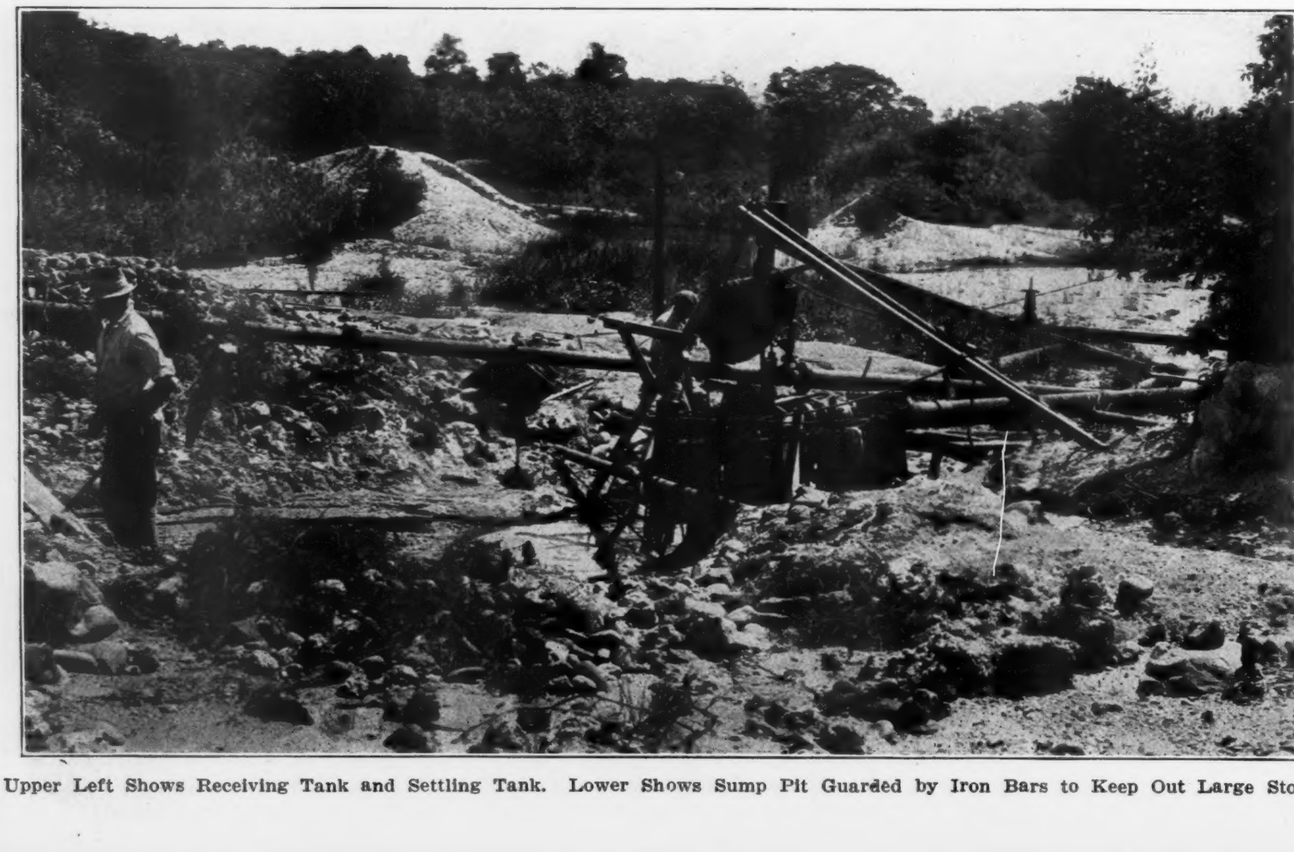


Upper Right Shows Pump at Base of Plant and Riser to Top. Lower Shows Gun in Operation

into the storage bins. The surplus water in the receiving tank and in the fine sand settling tank flows off through outlets near the top of the respective tanks.

Coming back now to the receiving tank, it is evident that when the coarse sand and gravel hit the baffle at only a moderate velocity they will drop back to the bottom. This coarse material passes through an outlet near the bottom to a Hummer vibrating screen. The coarse sand passes through this screen into a settling tank and then into the storage bins. The gravel passes through a chute to the scrubber which merely consists of a semicylindrical tank with revolving blades somewhat similar in principle to a single log washer which churns the gravel around and cleans it. The dirt is carried off with the water and the gravel drops into the bins or surplus storage piles.

The receiving tank and scrubber were designed by Mr. Meadows and are giving very satisfactory results. In fact all the operations are so greatly simplified that here also there is very little machinery which can hinder production by breaking down and it requires only four men to run it. The storage tanks are of steel and were furnished by the McCarter Iron Works. They are arranged for loading either trucks or freight cars as shown in the illustrations. Arrangements are also in process for making shipments by barge which is an easy matter because, as already stated, the plant is on the shore of the Raritan River. To this end a dock is being built and a 50 ton end dump car has been purchased from the General Equipment Company by means of which the materials may be transported from the bins to the dock and dumped onto



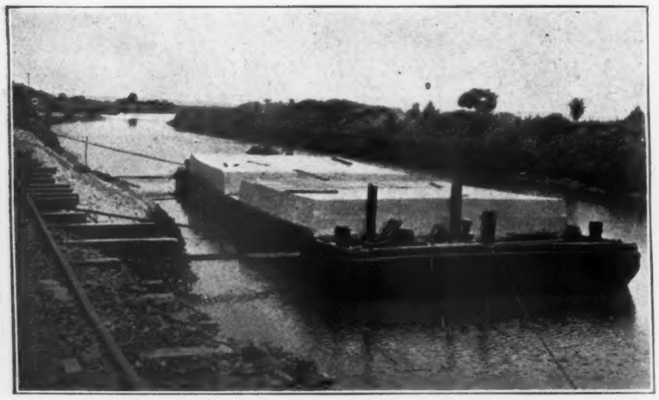
Upper Left Shows Receiving Tank and Settling Tank. Lower Shows Sump Pit Guarded by Iron Bars to Keep Out Large Stones barges. The Company has at the present time a standard gauge Vulcan Iron Works gasoline locomotive which is used for switching freight cars and this will be used for loading barges with the newly purchased dump car.

A Marion steam shovel with a long boom is used for a variety of useful purposes. Just now while considerable construction work is going on it is employed in this connection to a large extent. It is also used to load freight cars or storage bins from the piles of surplus which accumulate at certain times. The Company also operates a sand lime brick plant directly adjacent to the sand and gravel plant and it uses most of the fine sand produced by the latter. The bins for the fine sand are therefore located so as to be convenient to the brick plant.

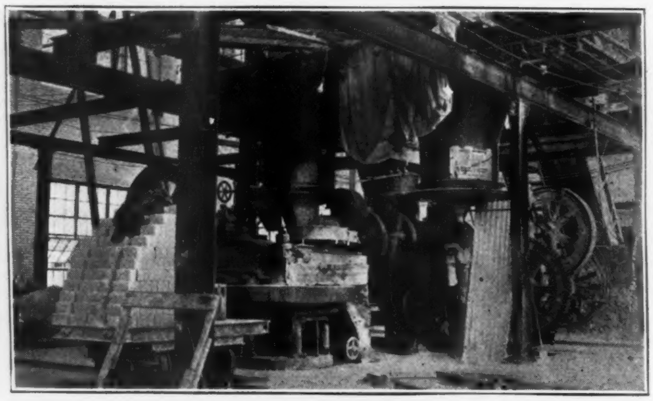
There is a power generating plant which is an inheritance from the former potash enterprise and it is being used with advantageous results, although under ordinary circumstances it would hardly pay to install it for the purposes for which it is now being used. The equipment consists of three 1,500 kw. 550 volt, 60 cycle, three phase General Electric turbo-generators and three 1,250 h.p. Sterling oil burning boilers. At present only one unit is being used. All of the motors are 550 volt inductive motors so that there are no transformers. Current for the motors at the gravel pit and at the pond is transmitted by means of overhead lines.

The making of sand lime brick is very economically carried on. Practically all of the fine sand which is produced is used for making bricks. Mechanical handling of materials has been developed to a high degree as will become apparent from

Upper Right Shows Scrubbed Gravel Coming Through Pipe to Bin. Lower Shows Brick Plant at Left and Sand and Gravel Plant at Right



Barge Load of Brick Ready to Ship



The Brick Machines

the following description. The steel sand bins made by the McCarter Iron Works are arranged in a row along one end of the brick house and the lime bins are adjacent to them. The lime which is now purchased in bulk is elevated to the top of the plant for hydrating and then descends through chutes to the storage bins. Under each set of bins is a belt conveyor and between each conveyor and the bins is a volumeter for metering the quantity of each material fed out. The conveyors discharge into a mixer and the latter discharges through a chute into the rod mill which breaks up any lumps which may have formed. All of this equipment has been purchased from Jackson & Church.

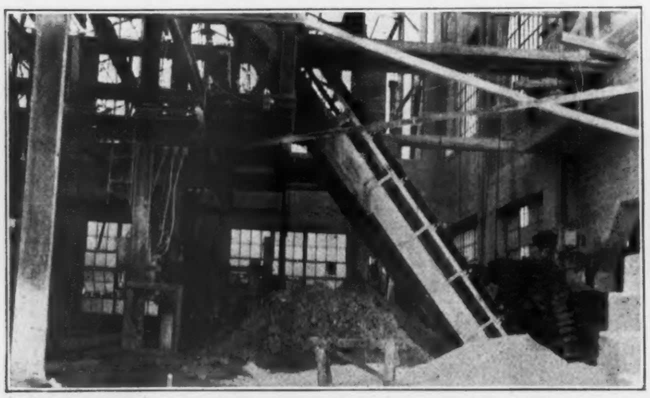
From the rod mill the mixtures of lime and sand is elevated by means of a belt with transverse cleats to a series of chutes which discharge into the hoppers over the brick machines. These brick machines are each capable of turning out 2,500 brick per hour. As the bricks are pressed they are placed on small steel trucks running on tracks to the end of the building where there is another track at right angles running out to the cylinders. Another truck travels on this track and those loaded with brick are run on to it, taken to the cylinders and pushed in. These trucks were also all furnished by Jackson & Church.

Mixing Machine in Brick Plant

There are four of these cylinders made by the McCarter Iron Works. When the bricks have been steamed for 8 to 10 hours, the trucks are loaded by a narrow gauge Vulcan gasoline locomotive and taken down to the Canal for storage or for loading on barges by a gantry crane.

The space to which the bricks are taken by the locomotive is covered by gantry crane which was erected some time ago when this site was used for other manufacturing purposes, but which comes in very useful in handling the brick. It can pick up a truck load and place it either on a barge, a freight car or a motor truck, the brick being left on this steel platform until unloaded at its destination.

As already stated, the burned lime is purchased in bulk. Plans are now in progress to burn the lime at the plant. The Company owns limestone quarries in northwestern New Jersey within practicable reach and preparations are being made to bring in the stone for burning.



Elevators from Under Rod Mill to Chutes Feeding Hopper Over Brick Machines

Lime Hydrators at Top of Sand and Gravel Plant

HYDRAULIC DREDGES AND HYDRAULICKING

By G. B. Massey

HYDRAULIC dredging has increased in use during the last few years. This increase has been quite marked during the last year. The increased use of the heavy oil engine for power resulting in a decrease of cost for doing the work has stimulated the use of the hydraulic dredge.

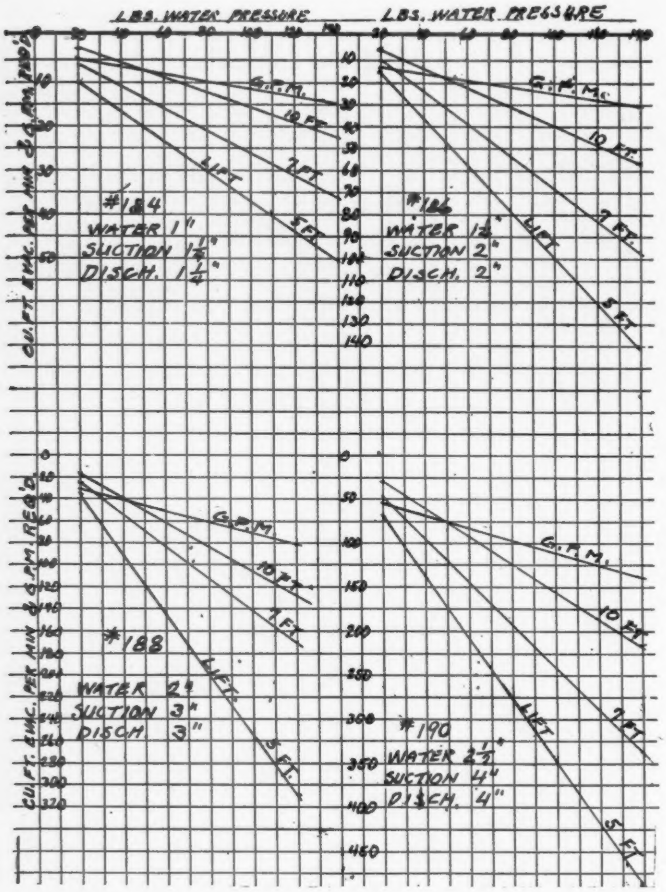
Power

The power on a hydraulic dredge is supplied by steam engines, oil engines, gasoline engines and electric motors. The oil engines are slow speed—250 to 400 r.p.m.—and require either a large diameter special pump or a speed increaser or belt or rope transmission. Recently there has been brought out at least one oil engine of higher speed. This engine is built with two to eight cylinders and a power range from 50 to 475 and with speeds up to 900 r.p.m. This engine can be direct-connected to a centrifugal dredging pump of standard make at about 600 r.p.m.

Gasoline engines are designed to run at speeds of 800 to 1100 r.p.m. which is too high for direct connection requiring, therefore, a speed reduction. As the use of a gasoline engine indicates an effort to keep down the first cost, the speed reduction is accomplished by belting or rope drive which are cheaper than a geared reduction unit. The steam engines which are used for driving centrifugal dredging pumps are almost invariably compound or triple expansion condensing and with a speed of 200 to 225 r.p.m. which requires a speed increaser for the pump or a big special pump. Usually the latter is chosen.

Electric motors may be had in such a wide range of standard speeds, that pumps are almost always direct connected to the motors. In most cases the current is alternating, and the best voltage to use is 440 as the wiring is reasonable in size and cost and the voltage is safer than a higher voltage. Most of the motors are three phase, sixty cycle, 440 volt induction motors, with slip rings, which makes the motor susceptible of speed change with suitable control. There are two standard control equipments, one for starting only and one which

Hydraulic Stripping In a Crushed Stone Quarry



has sufficient resistance grids to allow of the motor being run indefinitely at any speed from no load speed or nominal speed down to half that speed. A motor with fifty per cent speed reduction control is an ideal drive for a centrifugal dredging pump, as it combines light weight, low first cost, small space, speed change and the minimum of depreciation and delays for repairs.

The oil engine-electric dredge is the ultimate word in an economical general service hydraulic dredge but the first cost is higher than for any other type. The largest dredge of this type is now under construction and its operation will be of great interest to those considering this class of dredge.

In order to obtain a fixed yardage, ladders and cutterheads are a necessity. Cutterheads are of several types, each type possessing advantages in the different classes of material to be excavated. The cutterhead is pulled through the material by the swinging lines and the five-drum winch must have power to pull the cutterhead through any sort of material the cutterhead can cut. Each of the five drums is equipped with clutch and brake and a spool is usually provided for handling lines to barges or handling discharge line.

A New Pipe Joint

A new type of pipe joint has been introduced recently from England, called the Victaulic joint. It should prove popular on hydraulic dredges and some ten-inch joints are now being tried on a hydraulic dredge in Michigan. These joints cost about the same as the usual flanged joint, but are flexible under pressure or vacuum, each joint permitting of 5 degrees motion. The joint is attached to the pipe by turning a very shallow groove in each pipe near the end. The rubber ring is then put on and the two half clamps are bolted together holding the rubber ring and the two pieces of pipe in place. After connecting a joint, the two pipes can be rotated to any position with respect to each other. There is also a slight leeway lengthwise of a pipe line, each joint allowing of some end motion.

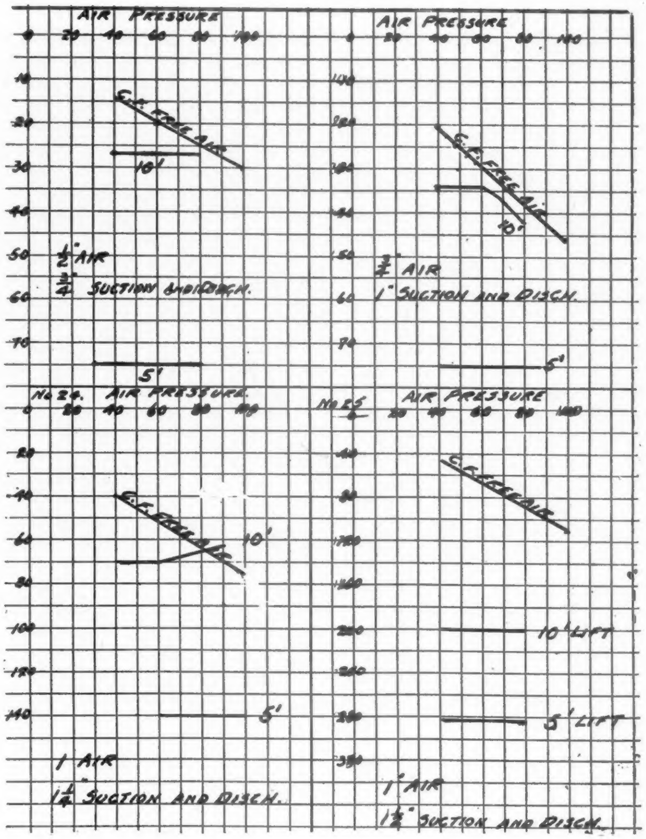
Showing the Progress of Hydraulic Stripping

Priming

There is only one way to prime a centrifugal dredging pump and that is to shut the enclosed flap valve on the discharge side of the pump and exhaust the air from the pump shell and the suction pipe. The air may be exhausted by a vacuum pump or by an ejector which is attached to the highest part of the pump shell. The ejector is a modification of the steam injector used for feeding boilers, being adapted for compressed air or pressure water instead of steam. On hydraulic dredges operated by heavy oil engines, compressed air is required for starting the engine and is also used for priming the pump. It is known what amount of air at what pressure is necessary to start the engine but not what amount and at what pressure is needed to prime the pump.

The manufacturers of ejectors rate their ejectors for heads of 5 feet, 10 feet, etc. The top of the dredge pump on most hydraulic dredges is not over ten feet above the water and some are not over seven feet so that in the diagram given here only these low heads are given consideration. It is necessary also to calculate the cubic feet of air which have to be evacuated from the pump shell and the suction pipe. With the head and cubic feet of air to be evacuated, we can see which size of ejector to use and how many minutes will be required to prime the pump.

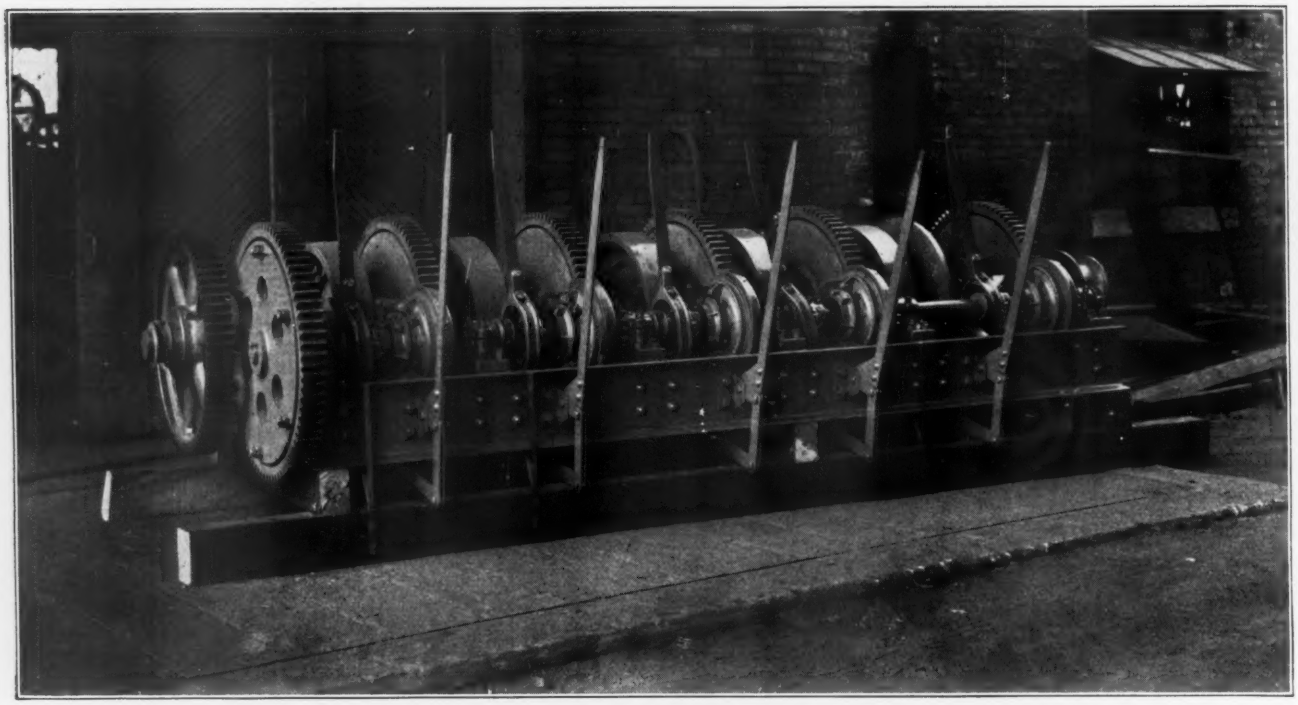
On dredges which are driven by gasoline engines or electric motors there is no compressed air available and it is usual to provide on such dredges, a reciprocating belt driven pump on the very small ones and a centrifugal pump belted or direct-connected to a small electric motor on the large ones. These pumps serve to supply the water for operating the ejector to prime the pump and also



to supply the service water for the pump gland and the cutterhead bearing. The reciprocating pumps will prime themselves without a foot valve but most centrifugal pumps require a foot valve. There is one type of centrifugal pump, made in small sizes, which will prime itself.

One of the diagrams shows the gallons per minute of pressure water required, at the different gauge pressures, to evacuate the different volumes of air in suction pipe and pump shell when lifting to a height of 5 feet, 7 feet or 10 feet. The four dia-

Quarry Site Before Stripping Operation



A Five Drum Winch

Interior View of a Pump House

grams are for four ejector sizes. The other diagram shows the rate in cubic feet per minute at which the air can be evacuated from the suction pipe and pump shell when using any of the four sizes of ejectors operated by compressed air. It also shows the number of cubic feet of free air required when compressed to different gauge pressures.

Hydraulicking

No new developments in this method of moving earth have been made during the past year. The art, as already developed, will accomplish wonders if properly applied. By reference to the illustrations the advantages of this method can readily be seen and appreciated. The advantages which were effective in this case are present in a great many other cases. The original ground surface was at a steep slope so that a machine such as a dragline could not operate effectively. The surface of the rock, which was uncovered in the operation, was very rough and at a considerable slope, making excavation with a shovel an awkward job.

The earth, if handled by a shovel or dragline, would have been left in the interstices of the rock, requiring cleaning up by hand. The available spoil area was at some distance across a highway and a railroad track. The hydraulic equipment was installed and has been most successful. The slope of the original ground surface was a help rather than a hindrance. The slope of the rock surface was of great benefit, as it provided sluiceways for the earth and water to run to the dredging pump. The earth was cleaned out of the interstices of the rock completely, leaving the rock perfectly clean. The low lying land for the spoil bank was purchased and a dyke built with a dragline machine. The water supply was obtained from an adjacent creek.

The discharge pipe from the dredging pump was laid in a culvert under the concrete through highway and was buried in the railroad grade so that neither crossing caused the slightest delay to the work or to their use.

As the fill approached the height of the dyke, a new dyke was constructed with its base partly on the old dyke and partly on the fill, with material from the fill. Sufficient area must be available in the spoil area to allow complete settling out of the material. The area required depends upon the nature of the material, the lighter material requiring the largest area. With proper settling the water can be used over and over without causing undue wear of the pressure pumps.

Medical service is provided in many manufacturing plants for the welfare of employees. Rest rooms, recreational advantages, opportunities for physical training, and other means of securing and maintaining fitness for work are found in industrial establishments.

The Highway Dollar

The United States Bureau of Public Roads has collected figures for each of the forty-eight states on expenditures for rural highways, showing total expenditures and the average apportionment of each dollar spent. New highway construction receives 62.9 cents out of each one hundred cents disbursed by state highway departments. Road maintenance requires 17.3 cents. Minor expenditures are payment of road bonds claiming 6.4 cents out of each one hundred; equipment and machinery taking 3.3 cents; and administration and engineering taking 4.6 cents. The amount to be spent on rural highways this year is $1,000,000,000 of which more than $600,000,000 will go into new construction if the apportionment shown by past years holds good. These figures are an average for the entire country. In some states more than eighty cents out of each dollar which the state spends for roads goes into new construction.

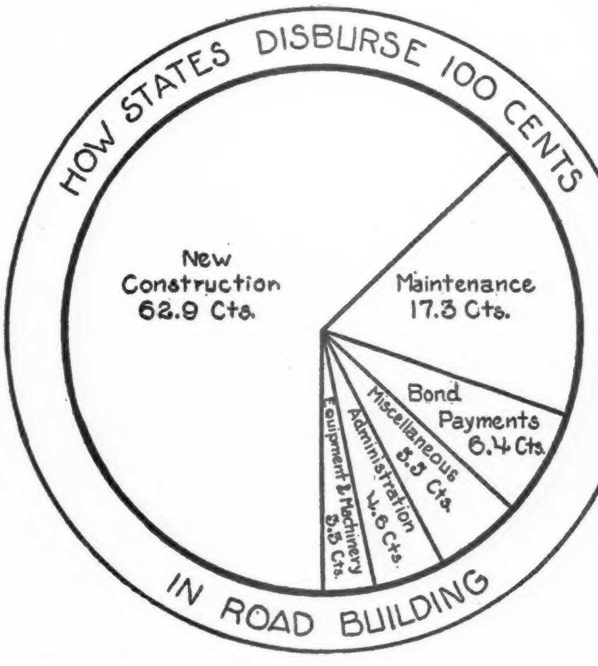


Chart Showing the Distribution of the Highway Dollar, Taking Forty-eight States and Averaging the Expenditures

Year Book Shows Healthy Growth in Standardization Movement

The movement toward standardization of industrial products has been considerably extended during the past year; and savings from standardization work are constantly growing in magnitude, according to the Year Book of the American Engineering Standards Committee, just issued. More than 200 definite standardization projects are in process or completed under the auspices of the A. E. S. C., and 365 national trade associations, technical societies and government bureaus are co-operating in the work through some 1,600 representatives.

Asphalt Producers and Contractors to Meet in Washington

What promises to be the largest and most important gathering of municipal officials and asphalt contractors, producers, engineers and chemists of the United States and Canada that has ever been held is scheduled for Washington, D. C., November 8th to 12th next, under the joint auspices of the American Society for Municipal Improvements, The Asphalt Association and the Association of Asphalt Technologists. Both separate and joint sessions will be held at various times during the week, the object being to discuss for mutual benefit a program of municipal improvements, particularly in the matter of street and highway construction, that eventually will make North American cities the most up-to-date in the world. All kinds of municipal problems will be considered but emphasis will be laid on street planning, design, specifications, types of paving and methods of construction, location, contract letting, excavating, opening and replacing pavements, street lighting, street and paving plant inspection, paving plant operation, paving methods between car tracks, street cleaning, snow removal and traffic regulation. Representatives of The Asphalt Association attending the Fifth Annual Asphalt Paving Conference to be held at the same time and place, together with representatives of the American Society for Municipal Improvements, will have places on the program of the joint sessions, as well as the sessions that will be held separately. All of the sessions, joint and separate, will be held at the Mayflower Hotel.

Separately, the American Society for Municipal Improvements will discuss such subjects as sewerage and sanitation, water supply, garbage disposal, public safety, city planning, municipal legislation and finance and miscellaneous subjects. The Asphalt Paving Conference will discuss such subjects as "A Service Study of Asphalt Pavements," "Adaptation of City Pavements to Country Highways," "Causes of Success and Failure of Bituminous Macadam," "Cold Patch and Cold Application in Pavement Upkeep," "Use of Soft Asphalt Cements for Surface Treatment," "Economic Selection and Use of Equipment," "Asphalt Contractors' Problems," and similar subjects. Stress will be laid on the matter of salvaging old macadam and gravel roads with asphalt. In addition to its individual sessions the Asphalt Paving Conference will meet jointly with the Association of Asphalt Technologists for a discussion of the technical and research problems of asphalt streets and roads.

At the joint sessions of The Asphalt Paving Conference and the American Society for Municipal Improvements, subjects of particular mutual interest will be discussed such as "Construction Details Essential to Effective Hot Mix Pavements," "Black Base and Its Place in Standard Specifications," and "The Economics of Salvaging Old Pavements."

Col. R. Keith Compton of Richmond, Va., is chairman of the Engineers' Committee, and J. H. Cranford of Washington, D. C., is chairman of the Contractors' Committee acting with C. G. Sheffield, president, and J. E. Pennybacker, general manager of The Asphalt Association, respectively, in arranging for the Fifth Asphalt Paving Conference and the joint sessions with the Association of Asphalt Technologists. The arrangements for the meetings of the American Society for Municipal Improvements are in the hands of the president of that organization, T. C. Hatton, Chief Engineer of Milwaukee, and its Secretary, C. W. S. Sammelman of St. Louis, acting with a special program committee. The joint sessions are being arranged by all the committees working together.

Among those who have already accepted places on the programs are A. H. Blanchard, professor of highway engineering, University of Michigan; R. H. Simpson, chief engineer, Department of Public Service, Columbus, Ohio; Dr. E. E. Butterfield, chemist, Borough of Queens, New York; Col. R. Keith Compton, director of public works, Richmond, Virginia; G. H. Henderson, chief engineer, State Board of Public Roads, Providence, Rhode Island; and Francis P. Smith, consulting engineer, New York.

July Construction Slumps 26 Million

July construction contracts in thirty-seven states east of the Rocky Mountains, which embrace about 91 per cent of the total construction volume in the country, amounted to $518,931,900, according to the F. W. Dodge Corporation. The decline from June was only about $26,000,000, or a little less than 5 per cent. The decrease from July of last year was about $28,000,000, or just over 5 per cent. Increases in the Central West were largely responsible for the moderate proportions of the month's decline.

The most important items in last month's contract record were: $184,939,600, or 36 per cent of all construction for residential buildings; $111,448,200, or 21 per cent, for public works and utilities; $62,764,400, or 12 per cent, for industrial buildings; $67,219,400, or 13 per cent, for commercial buildings; and $42,015,800, or 8 per cent, for educational buildings.

New construction started in these 37 states during the past seven months has reached a total of $3,629,090,400, compared with $3,295,729,200 for the first seven months of last year, an increase of 10 per cent. At the end of June the lead over last year was 13 per cent.

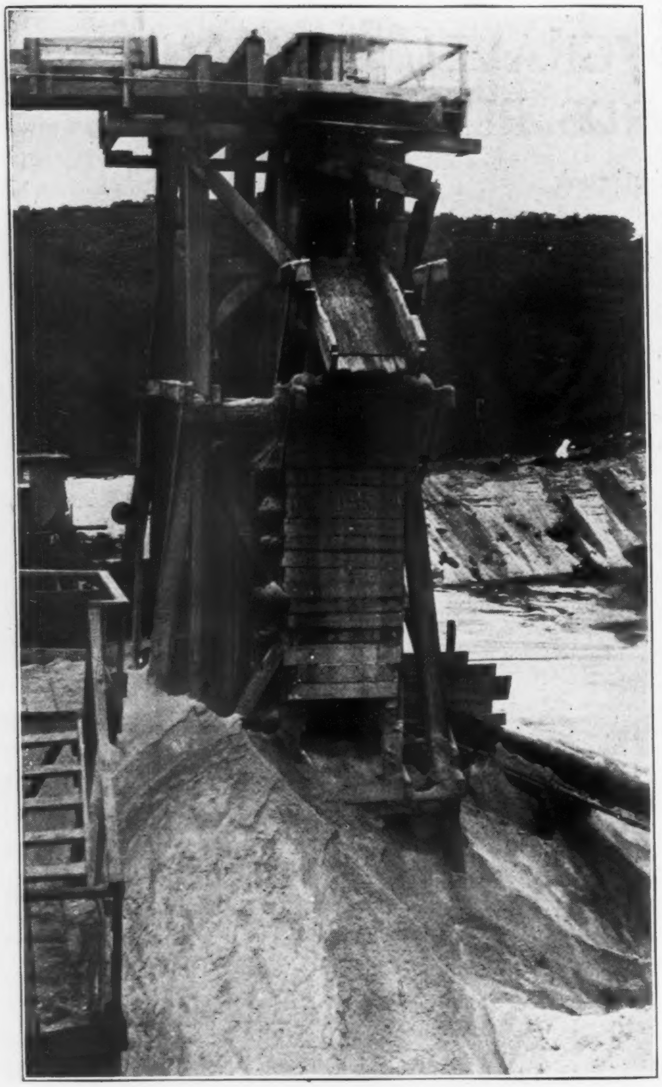
SEABOARD SAND AND GRAVEL COMPANY DREDGES 500 YARDS PER HOUR

By F. A. Westbrook

PRODUCTION of approximately 500 yards of sand and gravel per hour with the help of only 60 men is an achievement to be proud of. This is the regular performance of the Seaboard Sand and Gravel Company, which has offices at 26 Cortlandt Street, New York City, and its plant at Port Jefferson, Long Island. It is a hydraulicking operation. The material is taken from the high bluffs on the north shore of the island on Long Island Sound. The sand is very siliceous and is unusually sharp; about 90 per cent of the pebbles are hard white quartz, while the other 10 per cent is mainly granite. The material runs about 60 per cent sand and 40 per cent gravel. The dredge by means of which the sand and gravel are obtained was equipped by the Morris Machine Works and a good deal of the machinery on it was made by that company. This is true of the cutter which is supported by a 60 foot ladder. This cutter is fitted with a Taylor Wharton manganese steel head. It is capable of digging to a depth of 42 feet, and it is operated by a two-cylinder engine made by the J. S. Mundy Engineering Company. A five drum Mundy hoist is used for handling the suction and swing lines. Leschen wire rope is used. The cutter shaft and suction pipe are supported by a ladder 60 feet long of heavy plate construction. This total suction unit weighs 60 tons. The dredge is steam driven. The hull is of wood construction. The pontoon line from the dredge is made of ½ inch steel plate pipe 20 inches in diameter made by Spary and Chalfont. The total line is 1,000 feet, but the pipe is in sections of about 60 feet. Each length is carried on two wooden pontoons, and Parker ball and socket jackets permit motion in all directions. While the dredge has sufficient power to pump directly to the washing plant, it

Belt Conveyor from Scalping Screens to Sizing Screens

General View of Screening Plant

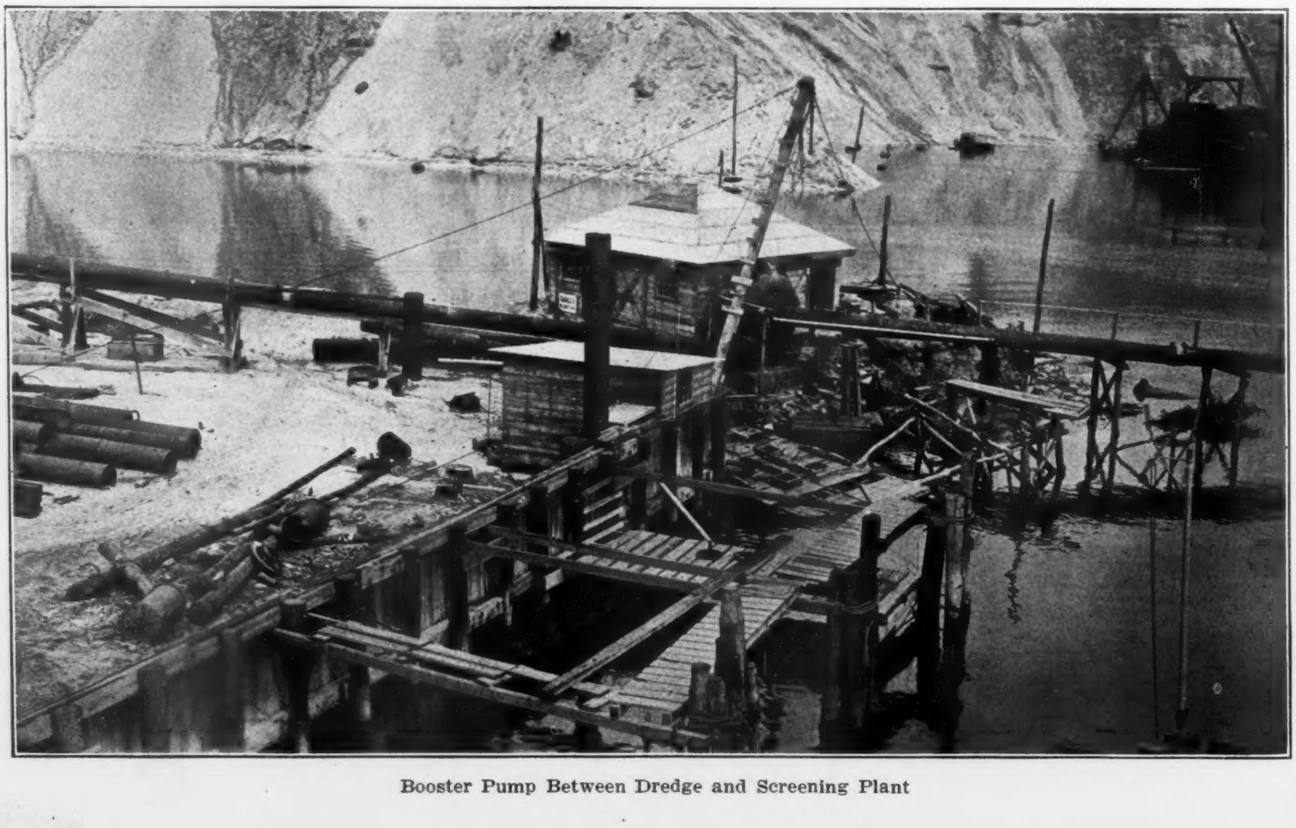


One of the Wooden Towers to Which the Sand Is Elevated and Then Discharged to the Storage Pile

has been found more economical to use a booster pump.

The sand and gravel are pumped to the screening plant through the 20 inch pipe line. For this purpose a Morris pump, driven by a triple expansion Morris engine rated at 650 h.p., but capable of developing 1,150 h.p., is employed. Steam at 170 pounds pressure is supplied for the engines on the dredge by four 250 h.p. Babcock & Wilcox water tube boilers. As an auxiliary to the cutting operation, the bank is kept washed down above the water line by a jet located on a small barge and stationed somewhat in advance and to one side of the dredge. Water is supplied to the nozzle at 100 pounds pressure by a Morris pump, electrically driven, and furnished with power by a submarine cable. The jet is used because of the very high bank, which, if left to cave off naturally as the cutter works in under it, is likely to cause damage on account of the large quantities which drop down at one time. The jet is not kept going all the time, but is run every second or third day as the need for it arises. A very practical and useful item of equipment on the dredge is a Le Roi portable electric arc welding machine having a gasoline engine. It is in more or less constant use for the repair of broken parts and for welding together sections of pipe, including the ball joints.

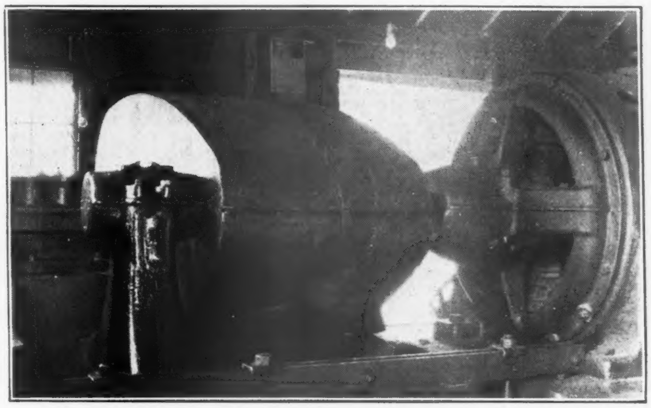
As a considerable ascent is necessary at the sizing and crushing plant, a Morris booster pump with a runner 54 inches in diameter has been installed near the beginning of the grade. This is operated by a 2,300 volt 350 h.p. General Electric induction motor equipped with two 14 inch silent chain Link-Belt drives. In fact, the plant itself

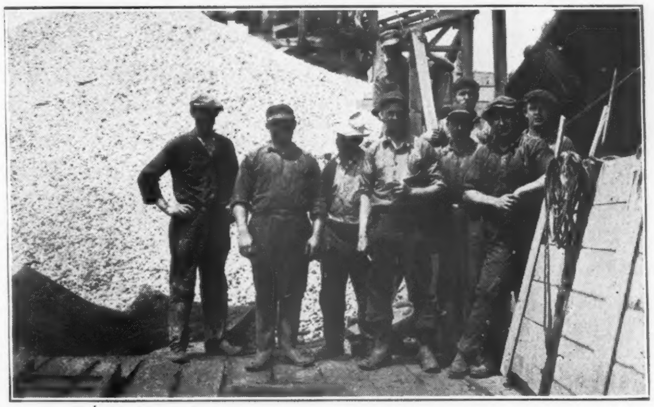


Booster Pump Between Dredge and Screening Plant was laid out by the Link-Belt Company. The thrust bearing is of the marine type and water connections are made to this bearing for cooling and to the packing glands to protect the packing from grit. A 3 inch pump supplies the water. The same features of water cooled bearings and water protection are found in the dredge pump. The booster pump receives the material from the dredge pumps in the suction directly and lifts the material to the washing and screening plant. The velocity of the pump discharge is reduced by discharging the material onto a spreading table so that the flow of the discharge is reversed in direction.

The contents of the pipe coming from the hydraulic dredge are first deposited on the "spreading table" at a considerable elevation, as shown in one of the illustrations. From here the material goes to two rotary scalping screens. These scalping screens are rather unusual in some ways and are very efficient. Each consists of three concentric cylinders about 20 feet long. The object is to remove the sand and deposit it for storage and also to take out the commercial sizes as a preliminary to sizing. The inner cylinder of the screens is made up of manganese steel sections 5 feet in diameter, perforated with round openings large enough to permit the passage of all sizes up to the largest, 1½ inches. They were furnished by the Frog Switch Manufacturing Company. The intermediate cylinder was obtained from the Manganese Steel Forge Company and has ½ inch square openings which permit the separation of the grit, or ⅜ inch sizes, from the other sizes and provide for the more efficient washing out of the sand by the water. The outer cylinder is Ton-Cap wire cloth made by the W. S. Tyler Manufacturing Company.

As the sand and water pass out from these screens, they are deposited at the top in a 12x16





Upper Right Hand Illustration Shows the Scalping Screens. Center Shows Chain Drive. Third Shows Some of the Crew, and Bottom

Sizing Screen and Conveyor for Loading Barges

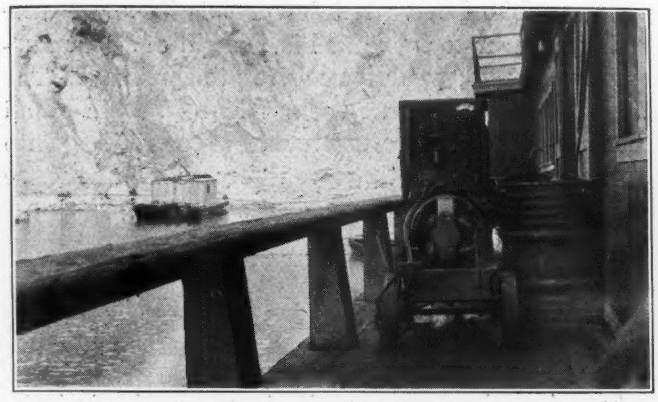
View of Cutter and Steel Ladder

foot settling box, associated with each. From the bottom of these settling boxes the sand is elevated by 36 inch Link-Belt bucket elevators to the top of wooden towers, where it is discharged by chute to the storage piles. There are separate elevators and towers for each settling box. The water which overflows from the settling boxes is conducted through troughs to either one of two large concrete settling basins, each of which is about large enough for a day's run. These concrete settling basins are elliptical in shape. The current enters and flows along one side and then along the other. It is from these tanks that the very fine sand is obtained, and this is of such an unusually good grade that it is shipped to surprisingly distant points. For instance, four 700 yard barges are shipped to Buffalo for filtering purposes every month by way of the Hudson River and New York State barge canals. The settling basins are emptied by means of an electrically operated Lambert derrick equipped with a 1½ yard Blaw-Knox bucket.

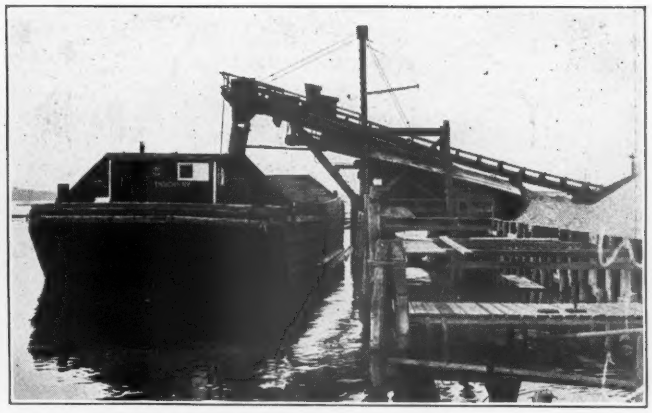
The oversizes which do not pass through the scalping screens are discharged into two No. 6, style K, Allis-Chalmers gyratory crushers. These in turn discharge into a pit where the crushed stone is picked up by a Link-Belt bucket elevator and again deposited on the spreading table with the material coming from the dredge. The commercial sizes, other than the sand, from the scalping screens come out on a belt conveyor made of Robins three pulley troughing idlers and a 42 inch New York Belting and Packing Company belt, which takes them to the sizing screen. The sizing screen consists of a 10 foot section having 1¼ inch openings, an 8 foot section with ⅞ inch openings, both made by the Hendricks Manufacturing Company, and an outside cylinder with ¼ inch openings, made by the New Jersey Wire Cloth Company. The various sizes, as they are separated by the screen, are dropped on rather short 30 inch belt conveyors with Robins idlers and New York Belting and Packing Company belts, which extend out from the structure at various angles and drop them on their respective storage piles.

As will be plain from the illustrations, the plant

Pipe Line Supported on Pontoons



Portable Electric Arc Welding Outfit Used for Repair Work and to Join Sections of Pipe



Loading a Barge

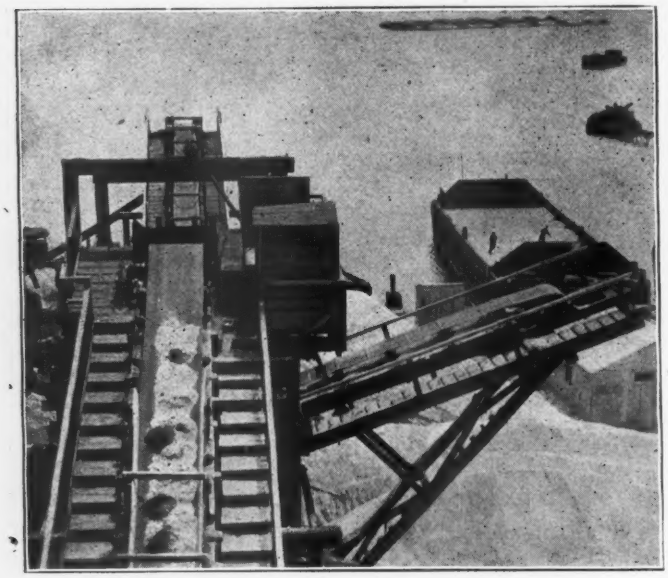
is located on the water front, and all shipments are made by water. This, of course, simplified the question of loading which is completely mechanicalized. This is accomplished by having a tunnel and belt conveyor under each storage pile. There is one main tunnel with branches under the different piles. The main conveyor extending out to the dock is 496 feet long and has the Robins idlers and a 42 inch belt made by the Buffalo Weaving and Belting Company. These 42 inch belts which have been installed account for the 500 yard production per hour of the operation.

With the exception of the dredge, all operations are motorized. Allis-Chalmers induction motors are used except in one or two instances, as for the booster pump, where a General Electric machine has been installed, as already noted. Most of the bucket elevators consist of a double row of buckets on 36 inch, 12 ply belts. Link-Belt buckets have been used to a large extent, although there are some of Hendricks manufacture. Some of the belts were also furnished by the Link-Belt Company and others by the New York Belting and Packing Company. The large number of belt conveyors in use makes it a matter of interest to know what kind of belt fasteners have given satisfactory service. For the 42 inch belts the No. 25 Standard fasteners have been adopted, and for the 36 inch, 12 ply belts, which carry a heavy lifting load, size I Jackson fasteners are used. The latter are of English make.

To give an idea of the amount of business done by the Seaboard Sand and Gravel Company, it may be stated that during the month of June 129,972

Fine Sand Settling Basin of Concrete and Unloading Hoist

Dredge and Pipe Line Supported on Pontoons. Note Height of Bank



Conveyor to Sizing Screens in Center and Conveyors from Sizing Screens to Storage on Each Side. Only one Side Is Shown Here

yards were shipped. Shipments on this scale mean, of course, that special measures must be taken to avoid congestion of barges at the dock. This is very effectively accomplished by having a stake boat some distance out in the harbor where the empty barges are tied up as they are brought in by tugboats. The company has a tugboat of its own whose function is to bring empty barges from the stake boat to the dock and to take away loaded barges from the dock and leave them at the stake boat. Thus it is unnecessary to have tugs with a number of barges around the dock interfering with loading operations. As soon as the right number of loaded barges have been accumulated at the stake boat, a tug is in readiness to take them away. As there is plenty of space, this can be accomplished with minimum effort and disturbance.

Industrial Profits Lowest Since 1920

Despite the abounding prosperity on the part of many individual business concerns, indications are that less of the consumer's dollar is going into manufacturing profit now than has been the case at any time since the war, with the exception of the critical year 1920, according to a study of manufacturing corporation incomes made by the National Industrial Conference Board of New York.

While in 1919 9.28 cents out of every dollar of the manufacturer's gross receipts represented net income, his net income amounted to only 6.35 cents per dollar of gross receipts in 1923, the latest year for which comprehensive income statistics are available. Out of that, moreover, he had to pay income and profit taxes.

Although increased manufacturing efficiency may have increased the net income somewhat since that time, higher wages and practically stable price level combined have not left much leeway to the manufacturer to increase his margin of profit during the last two years, according to the board. The figures cited represent the total net income of all manufacturing corporations combined, taking into account those operating profitably as well as those operating at a loss.

Social and Business Life Mixed In Latin America

The American commercial traveler who is lacking in tact and courtesy labors under a considerable handicap in Latin America, according to a guide book to Latin America made public recently by the Commerce Department. The average Latin American, the book points out, is keenly sensitive to the little niceties of conduct. He does not want to be rushed and the hustling, "breezy" type of American "go-getter" will find his style rather cramped in Central and South America.

Social and business life, the book reveals, is not divorced to the same extent in Latin American countries as in the United States. As a matter of fact it is pointed out that many an important contract is signed over the coffee cups and many a business deal consummated in the lounge room of some club. It is advisable, therefore, for the commercial traveler going to Latin America to be armed with as many letters of introduction as possible so that he may gain entree into the social circles which his prospective customers frequent. A salesman who expects to do business in a big way in Latin American countries should be provided with a complete outfit of dress clothes—and this includes a frock coat and a silk hat.

The Latin American business man, the guide book reveals, is inclined to judge the character of an establishment by the "front" its representatives put up. It is consequently poor economy to patronize any but the best hotels. Business cards and stationery should be of the finest quality and, if the firm is a long-established one, it is an excellent idea to have them show the date of its founding. Commercial travelers who have to "make" small towns in Latin American countries are counseled to use every means to obtain letters of introduction to individuals in these towns at whose homes they may stop while transacting their business. In this way they will secure a maximum of comfort and cleanliness, and they will also be able to form social contacts which may prove of great assistance to them in a business way.

Travelers making their first trip to Latin America, the guide book states, should be exceedingly polite to customs officials if they want to get their baggage and samples cleared without too much trouble.

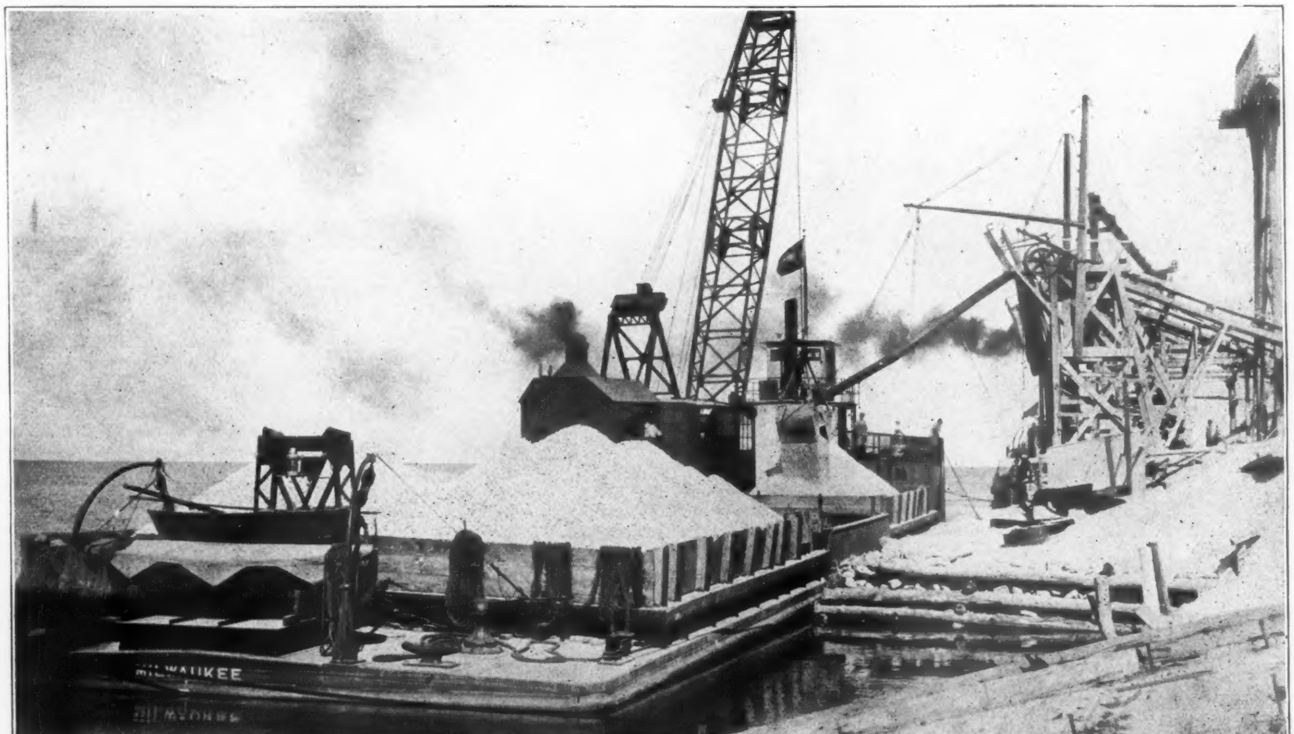
LEATHEM SMITH EFFECTS MANY ECONOMIES WITH SELF-UNLOADING FREIGHT SHIPS

By E. D. Roberts

LEATHEM D. SMITH is known for doing things in a big way. As president of the Leathem D. Smith Stone Company he is directing the affairs of one of the finest crushed stone plants in the country and probably the largest in Wisconsin. As president of the Leathem D. Smith Dock Company he is developing an enviable business. Mr. Smith has recently adopted the power scraper in the conversion of standard bulk freight ships to self unloaders. The use of these scrapers has effected some big economies in certain kind of shipping. The great proportion of shipping on the lakes is bulk material, i. e., stone, sand, gravel, coal, etc. The source of delivery and supply have been fairly constant with the result that shore stations have sprung up at various points to load and unload the ships.

One of the main features of the scaper unloader system adopted by Mr. Smith is the conserving of two-thirds of the space which is usually wasted in hopper bottomed ships. Primarily this system consists of one or more tunnels built into the bottom hold. A Sauerman Crescent power drag scraper operating in these tunnels and dumping into a hopper at one end feeds the material to a system of conveyors leading from the hopper to the shore piles. The roofs of the tunnels are self-cleaning, and the spaces between tunnels and sides of the cargo space are hoppered, so that the entire boat is self-cleaning. The material flows by gravity into the tunnel through openings in the walls, which extend their entire length. These openings have gates which are used for regulating the flow into the tunnel either to trim the boat or to keep the divided cargo separate. The scraper operating back and forth in the tunnel carries its load up an incline where it is dumped into a hopper at the front end of the boat. The material is then carried by an inclined belt conveyor onto the deck to a second belt conveyor, which operates on a swinging boom and carries the material away from the boat. By means of the pivot at the receiving end of this conveyor the dumping end can be swung around to any position without stopping and unloading. These conveyors are of Stephen Adamson manufacture.

The eight yard Sauerman scrapers in use in the larger vessels hold 10 tons of stone or 6 tons of coal and have an average unloading capacity of 700 tons per hour. They are operated by double-drum steam hoists placed at the forward end of the ship on the tank top, alongside the foot of the scraper incline. The speed of the loaded scraper is from 200 to 250 feet per minute and the maximum back-haul speed is from 400 to 500 feet per minute. A decided advantage of this scraper-unloading sys-



Loading the U. S. Government Barge "Milwaukee" tem is that the continuous gate openings make it possible to handle non-free-flowing materials and allow a selective discharge into the unloading tunnels. Material being carried on the ship's cargo-floor lowers the center of gravity between three and four feet, as compared with the hopper bottomed type, making it possible to safely convert to this service the standard bulk freighter with its deep water bottom tanks.

This new method of unloading ships not only minimizes freight charges by getting the cargo to the dock nearest the final destination but is bringing back into service many vessels which were formerly discarded as limited capacities prevented their competing with new freighters. The system has already been installed on several of the lake boats, and two are now being equipped to handle wet sand, a non-free-flowing material, and break water stone in pieces of 20 to 200 pounds.

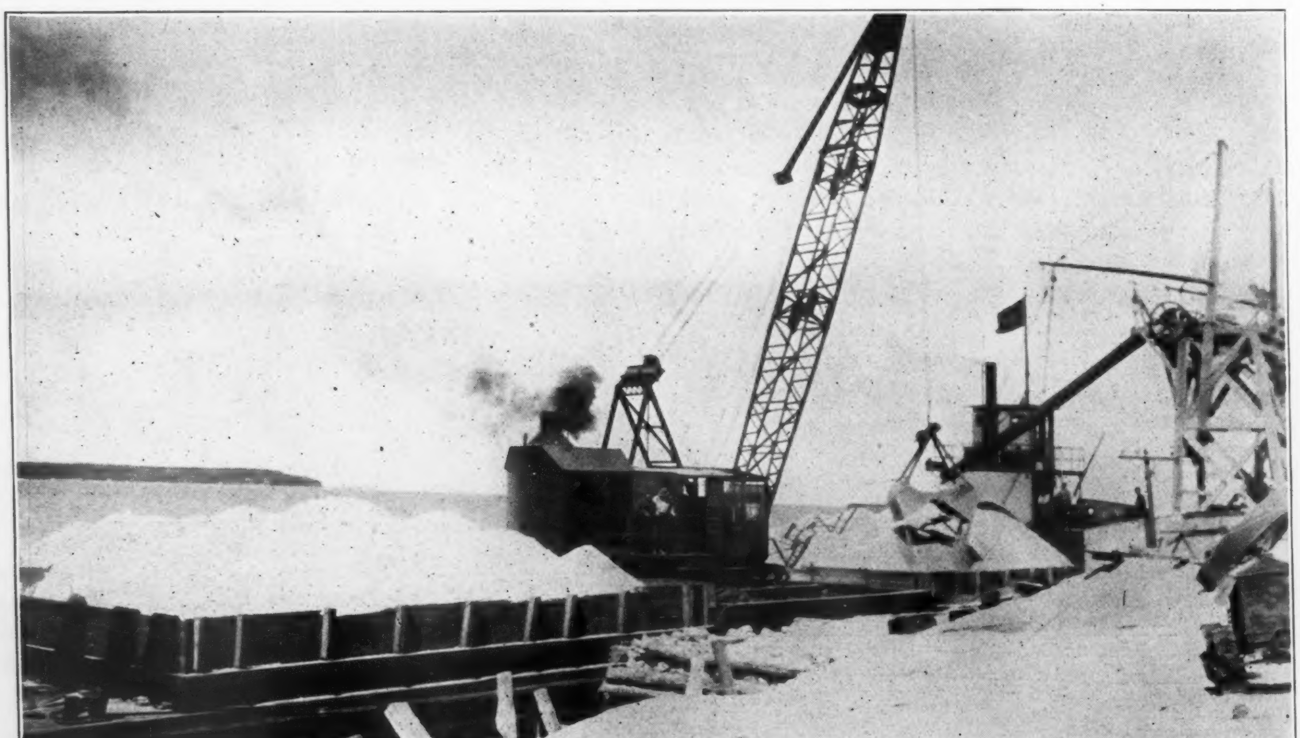
The plant of Leathem D. Smith Company, Sturgeon Bay, Wisconsin, has some unique features. It is located without rail communication, and with a total yearly local need to require only one day's operation. The crushing plant is located on Sturgeon Bay, an arm of Green Bay connected by canal with Lake Michigan. The plant produces from 2,500 to 3,000 tons of graded stone daily on one shift, and depends entirely on water transportation for delivery of the rock. Delivery of the rock is insured by a partnership interest in one boat with the Cleveland Cliffs Iron Company, a personal interest owned by Mr. Smith in the steamer Fontana, and a 5-year carrying contract on the steamer John McCarty Kennedy. The United States Government barges as well as some owned by several large contractors also call at the plant for large cargoes of rock which they transport to various ports.

Typical of these barges is the Milwaukee belonging to the United States Engineering Department which can load a thousand tons of rock in two hours. She is constructed of steel with compartments fore and aft for the storage of bulk freight and fitted with a large McMyler-Interstate full revolving crane amidship equipped with a clam shell bucket. Material from this barge can be quickly unloaded at any desired point without the aid of other equipment. There is a heavy traffic in coal from the lower lake ports in Ohio to Wisconsin, and these boats are often chartered to convey a rock cargo to Detroit or some other lower lake port. This service has made such towns as Detroit a logical market for the product of this plant.

The quarry has been worked in from the grade and has now a face 55 feet high and over a thousand feet long. The rock is dolomite, having a French coefficient of hardness of 12 and a toughness rating of 15.6. A chemical analysis of two samples shows:

Calcium carbonate	51.42	49.59
Magnesium carbonate	44.88	42.93
Silica and insoluble	2.04	4.76
Alumina	1.84	1.44
Alkali	0.82	1.28
	100.00	100.00

Two Sanderson cyclone drills, one operated with electricity and the other by gasoline, are used to put down the drill holes which are 6 inches in



Crane Trimming Loads Coming from Spout at Right diameter, placed 20 feet from the face and on 20 foot centers. Du Pont dynamite, 60 per cent, 40 per cent and low density, is placed at two points in the holes, one at the bottom and the other 18 feet up in the hole. After the shot a small steam shovel travels along the toe of the mass, picking out the large blocks for rip-rap. These large stones are loaded onto a truck and hauled to the wharf, where an A-frame derrick unloads them, placing them convenient for loading onto barges.

A 40 h.p. General Electric motor driving a large Ingersoll-Rand air compressor furnishes compressed air for operating the jackhammer drills used to break up extremely large boulders.

In handling the smaller pieces two railroad type Bucyrus steam shovels are used to load the rock into four yard Western side dump cars. These are moved in trains of five cars each by one of the two Whitcomb gasoline locomotives, or an American Locomotive Works steam locomotive or a Baldwin Locomotive Works steam locomotive. With these four trains working, a constant stream of rock is poured into the large 42 inch by 60 inch Worthington gyratory crusher.

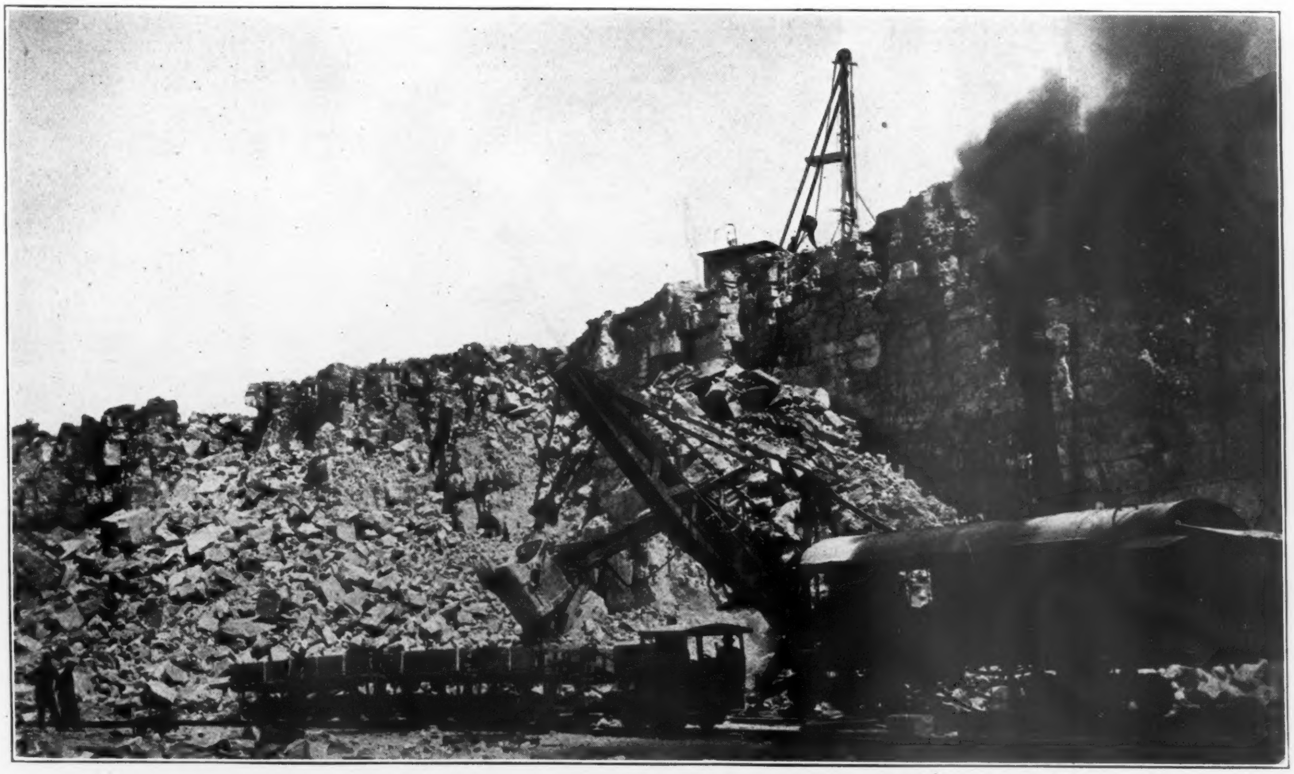
The discharge from the Worthington gyratory crusher falls onto a Robins traveling grizzly, which allows all rock under twenty inches in size to fall through and be chuted onto an 8 ply 42 inch Stephens-Adamson belt. The oversize rocks are discharged into a McCully gyratory crusher, which, after breaking up the large boulders, discharges them directly onto the 42 inch belt previously mentioned. This carries the material to the sorting room, where it is discharged onto another Robins traveling grizzly. Any rock over 8 inches in size is retained on the grizzly, carried over and discharged onto a belt conveyor leading up to a cross conveyor over the storage area, where a Stephens-Adamson traveling tripper deposits the stone at the required point. The material passing through the last named grizzly falls onto another Robins grizzly directly below, which retains all stone over 3 inches in size. This 3 inch rock is then discharged onto a belt conveyor that carries it out and discharges it on the storage pile. The large rock is by-passed into a battery of crushers located directly below the grizzlies.

This battery of machines consists of a 10 inch Worthington, a No. 6 Austin gyratory and two 12 inch Allis-Chalmers reduction crushers. These are located so that they discharge the material onto a 36 inch inclined belt which carries the crushed stone to the main distributing bridge.

Another reduction crusher is to be added soon to keep pace with the demand for small specification rock.

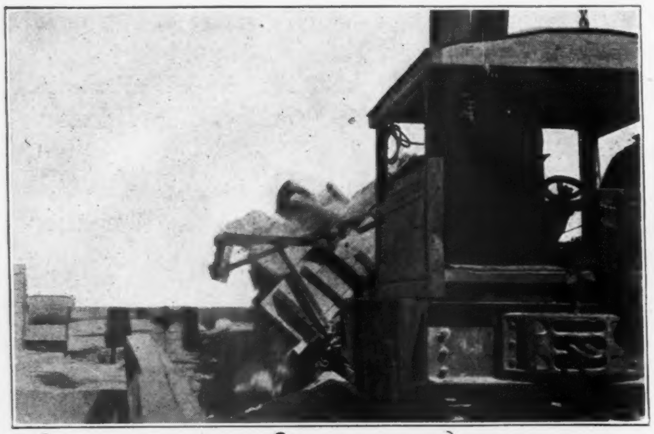
A large A-frame derrick has been provided so that repairs can readily be made to the Worthington gyratory crusher or to the McCully gyratory crusher, which is located below the Worthington. This derrick is operated by an electrically operated double drum American hoist, which is also used to move heavy pieces from the roadway to the quarry floor.

Following the operations, after the material has been conveyed to the distributing bridge, the stone

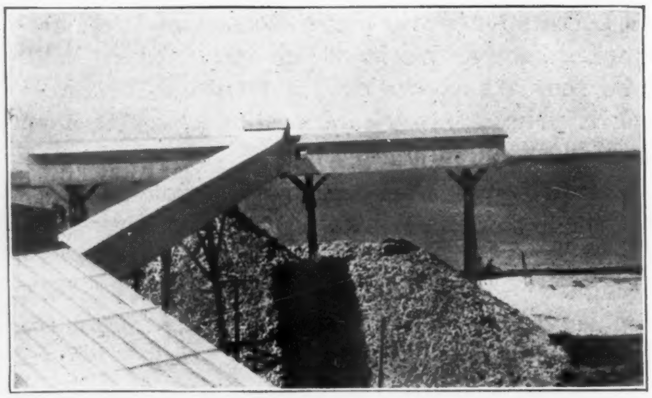


A Close-up of the Shovel Loading Cars

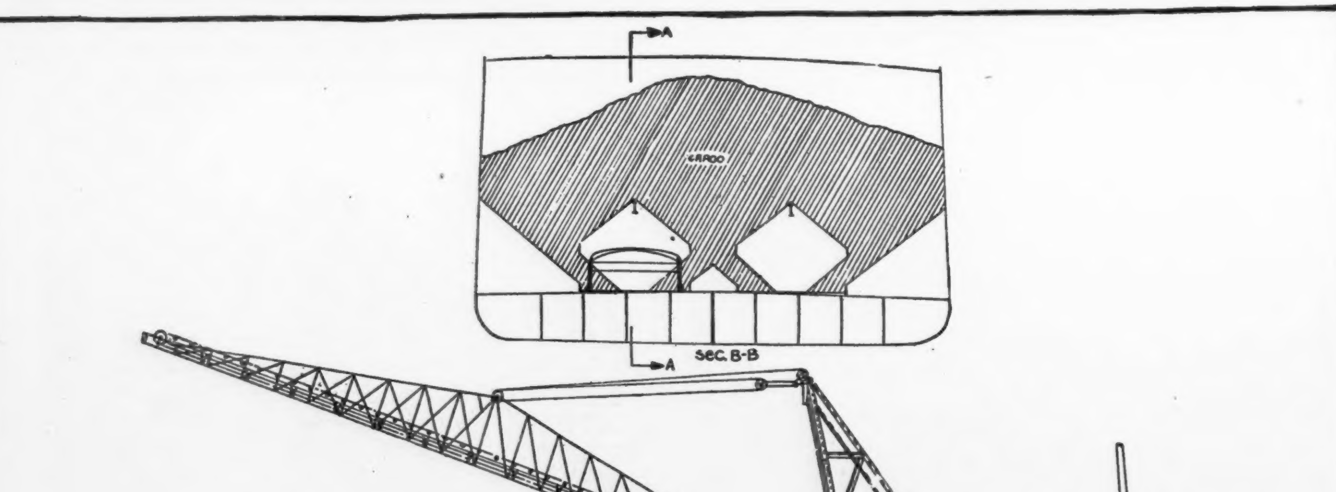
A Short Stretch of the Quarry Face



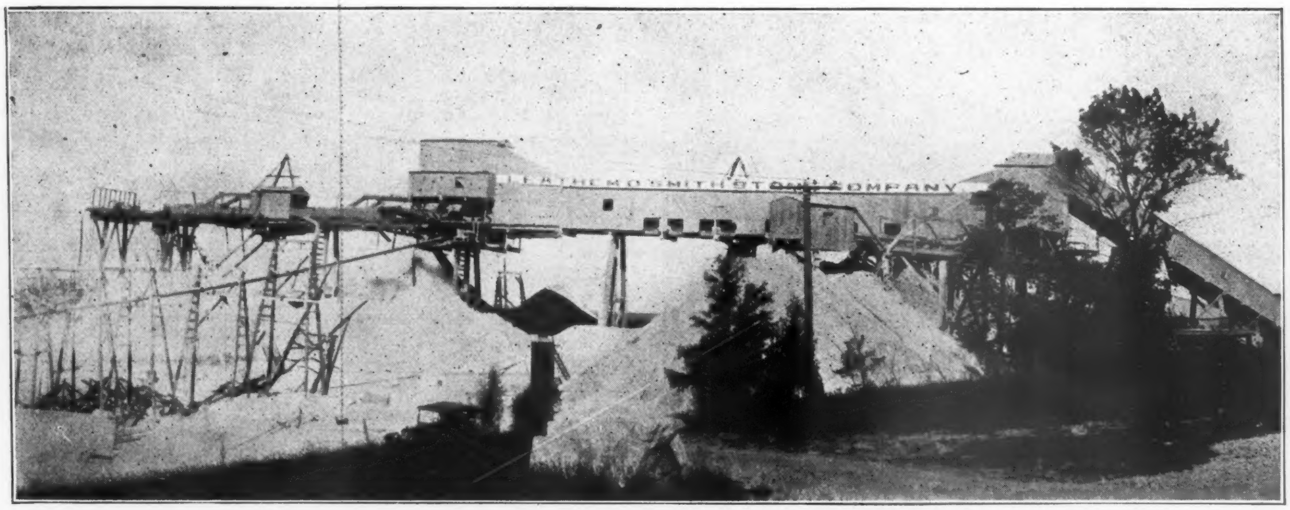
Discharging Stone Into the 60 Inch Crusher



Storage Conveyors for 8 to 20 Inch Stone



PROFILE AND CROSS SECTION OF STEAMER FONTANA WITH SELF-UNLOADING EQUIPMENT INSTALLED



The Main Distributing Bridge at Plant

enters two Universal vibrating screens which are set directly over another set of two Universal vibrating screens. The upper set of screens retains the rock from 2 to 3 inches in size and discharges it onto a 30 inch conveyor belt. The lower set of screens retains everything above 1/4 inch and discharges it onto another 30 inch conveyor belt. The dust and fines passing through the lower set of vibrating screens are carried out and discharged onto the storage pile by means of another 30 inch conveyor belt.

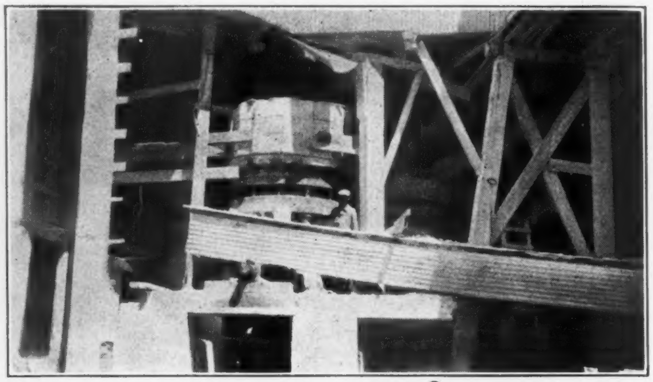
A Stephens-Adamson traveling tripper discharges the 2 to 3 inch rock at the desired point on a belt which runs half the length of the distributing bridge. The first portion of the chutes leading from the tripper is made of screening to allow small particles in the rock to pass through. This material falls onto another chute which discharges it on a moving belt placed directly under the upper belt.

After passing the end of the upper conveyor belt, the lower belt is led to the top of the distributing bridge, where it discharges the material into a battery of four Universal vibrating screens, arranged to slope two each way from the center. These screens retain the rock over 1 1/4 inches and discharge it on a cross conveyor belt which carries it onto the storage piles. The lower screens discharge all rock over 1/4 inch onto a 24 inch conveyor belt which carries the material onto the storage pile. The fines and water which pass through the screens are carried by means of a pipe to a location below the plant site.

Under the storage piles concrete tunnels have

Conveyor System for Unloading Boats

F. J. Erdman in Quarry Truck



Reduction Crushers Bunched and Discharging to Common Belt

been constructed, with gates on the top. When these gates are opened, the rock will flow by gravity onto conveyor belts which are operated in the tunnels. There are three main tunnels, placed at a right angle to the wharf, and parallel to the main distributing bridge. Cross tunnels have also been constructed, so that all grades of rock can be loaded onto the barges or ships from each main tunnel at the same time. These cross tunnels come above ground just before they reach the dock, to allow the conveyor belt to rise a sufficient height for easy spouting of the rock to any part of the vessel. Stephens-Adamson shuttle conveyors allow the extension of the conveyors over the edge of the dock while a barge is being loaded. The combined capacity of the three loading conveyors is 500 tons per hour, and by bringing several kinds of rock, grading from small to large, delivery can be made to satisfy any specification.

Allis-Chalmers motors are used throughout the plant for operating the crushers and conveyors. The largest of these motors is 200 h.p. and drives the Worthington gyratory crusher by rope drive; the secondary McCully crusher is driven by a 100 h.p. motor through belt reduction.

One of the large orders to be filled this year is from 60,000 to 80,000 tons of rock ranging from 8 to 20 inches in size. This rock is to be used on United States Government contracts for filling sections of reinforced concrete breakwater, which have been pre-cast and set in position. These sections are to be filled with the large stone and riprapped with the derrick stone. The executives of this company are: Leathem D. Smith, president; F. H. Behringer, secretary, treasurer and superintendent, and F. J. Erdman, foreman.

Tug "Cumberland" Taking Out Barge "Milwaukee"

Gypsum and Lime Companies Merge

The Universal Gypsum Company of Chicago and the Palmer Lime and Cement Company of New York have recently concluded their negotiations looking to the merger of the two companies into one corporation, the Universal Gypsum & Lime Company. The value of this merger can hardly be over-estimated, because it is an advanced step, bringing together two important building material producers into one institution. This will insure distinct economies in operating, as both gypsum and lime products will be distributed to the consumer through practically the same channels, although they have different uses in building construction.

The consummation of this deal brings to Universal Gypsum & Lime Company men of high standing in the financial and commercial world, as members of the board of directors, and also men of unquestioned ability in operating the company. The consolidation further evidences the unusual and substantial progress of Universal Gypsum Company from the time of its organization less than four years ago.

The Universal Company has developed new uses for gypsum, and controls patents covering these products, both domestic and foreign, and it is rapidly increasing its business, largely on account of the new products it is introducing to the building trade. It is also true that the Palmer Lime and Cement Company, which now becomes a part of Universal Gypsum & Lime Company, has made remarkable progress in developing new processes for manufacturing a greatly improved lime, which is accepted by the trade so extensively that it is necessary for the company to add additional equipment to meet the demand for this newly developed material. The Universal Gypsum & Lime Company will continue to follow its constructive policy in the manufacturing and marketing of products which contribute to better construction and more comfortable homes.

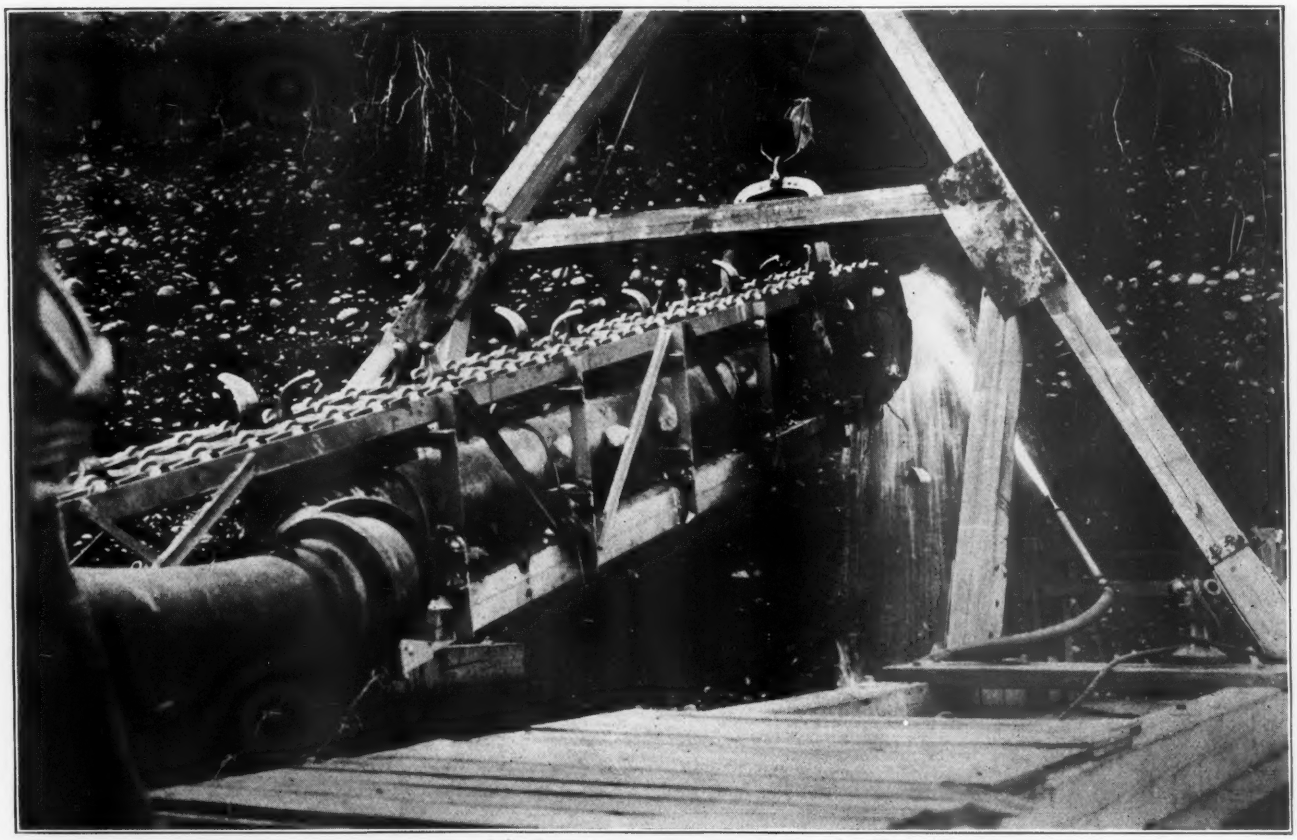
CHANGES PLANT TO DREDGING OPERATION AFTER REACHING WATER LEVEL

By F. A. Westbrook

THE operation of the Morris County Crushed Stone Company at Morris Plains, New Jersey, consists of two distinct plants, one of which is most unusual. Sand and gravel are produced at both plants. One receives its material from a steam shovel and sizes by means of rotary screens; the other receives it from a hydraulic outfit and sizes by means of stationary screens. This latter method is probably the only one of its kind in the country. It may seem surprising that a sand and gravel plant located inland and not even on a river can be operated by the hydraulic method. The reason is that the bank, which is a mixture of almost pure sand and gravel, is actually an ancient river bed, and as soon as a depth of something like 50 feet has been reached, water in very large quantities is found. The sand in some instances extends fifty feet below this water level. The deposit is close to the glacial terminal moraine extending across northern New Jersey.

Originally, the sand and gravel was taken out entirely by a steam shovel, and this, as already stated, is being done at present; but when the water level is reached, this method of excavation is no longer practicable. Consequently, the hydraulic method is now also being used. The hydraulic outfit consists of a special Swintek agitator with 8x9½ inch openings, driven by a 25 h.p. General Electric motor, and a 15 inch Amsco pump mounted on a dredge. This dredge is 52x42 feet and is built of 6x12 and 8x12 yellow pine lumber. The dredge is also equipped with a 3 inch high speed Worthington pump driven by a 25 h.p. Crocker Wheeler motor. This unit is used for cutting down the bank above water level to avoid slides. The production of this unit is 150 to 200 tons per hour, depending upon conditions such as the solidity of the bank. Material is taken out to a depth of 10 to 25 feet below water level, depending upon the analysis of the material.

The suction pipe is 15 inches in diameter from the agitator to the rear end of the boat. From the latter point to the plant, a distance of about 800 feet, it is 12 inches in diameter except for a few sections which have recently been renewed. As old sections are replaced, the larger size will be substituted, as experience has shown that operation can be made still more efficient in this way. The flexible connection at the ladder is a piece of 15 inch rubber suction hose made by the New York Belting and Packing Company. One of the illustrations shows how the pipe is supported partly on



Suction Line Showing Flexible Suction Hose Connection

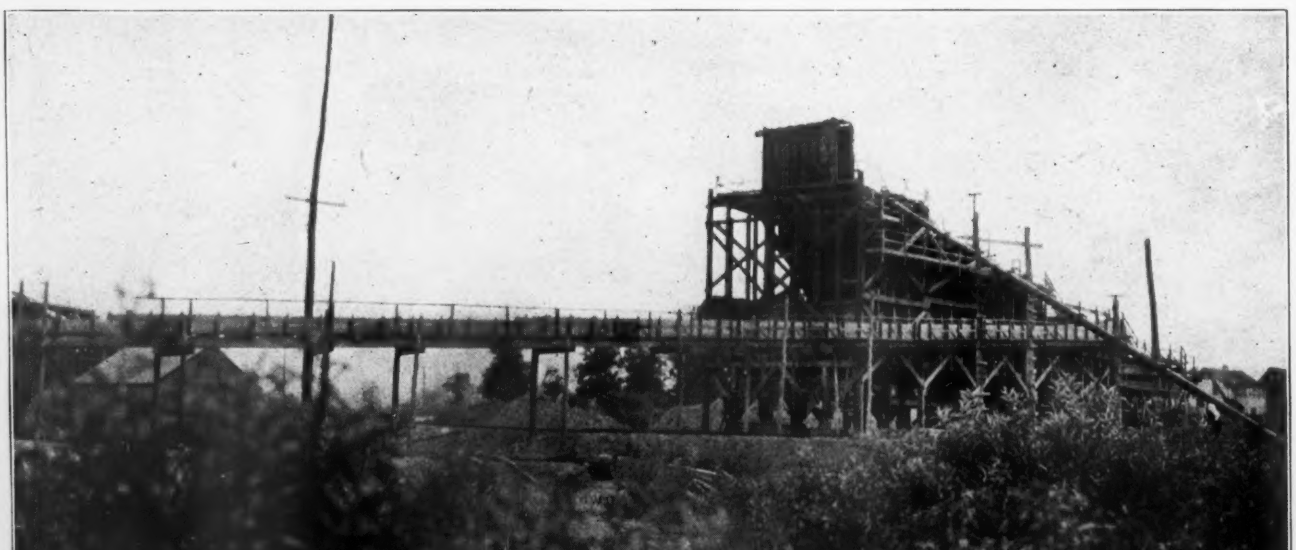
Close-up of One of the Cascades, Showing the Woven Wire Screens

View of Dredge and Jet

pontoons and partly on the ground. Under the conditions existing here, ball joints in the pipes are not necessary.

The pump is driven by a 400 h.p. Westinghouse motor and an endless leather belt 40 inches wide, made by the Chas. A. Schieren Company. The ladder of the cutter is operated by means of an electrically driven National Hoisting Engine Company hoist.

The hydraulically excavated material is pumped to the top of plant No. 2, where it is discharged into a scalping box and first passes over two grizzlies. The first of these has a 4 inch spacing and is made of arrowhead iron. The second is a 2 inch square screen made by the W. S. Tyler Company. The material which passes through these grizzlies is a mixture of commercial sizes, but as it comes through with a heavy rush, there is a certain amount of the 1½ inch size which is carried along with the oversizes. This would, as a consequence, go into the oversize bin for crushing if some means were not taken to prevent it. To preclude this

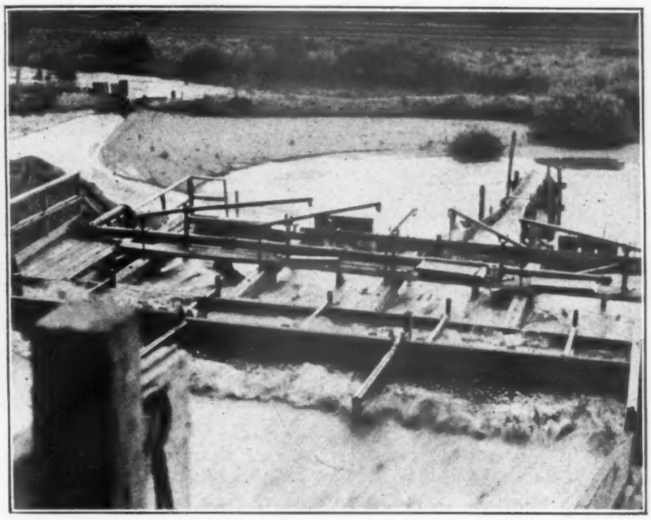


Plant Number 2, Showing Pipe Line to Scalping Box

Steam Shovel in Operation at Bank Above Water Line

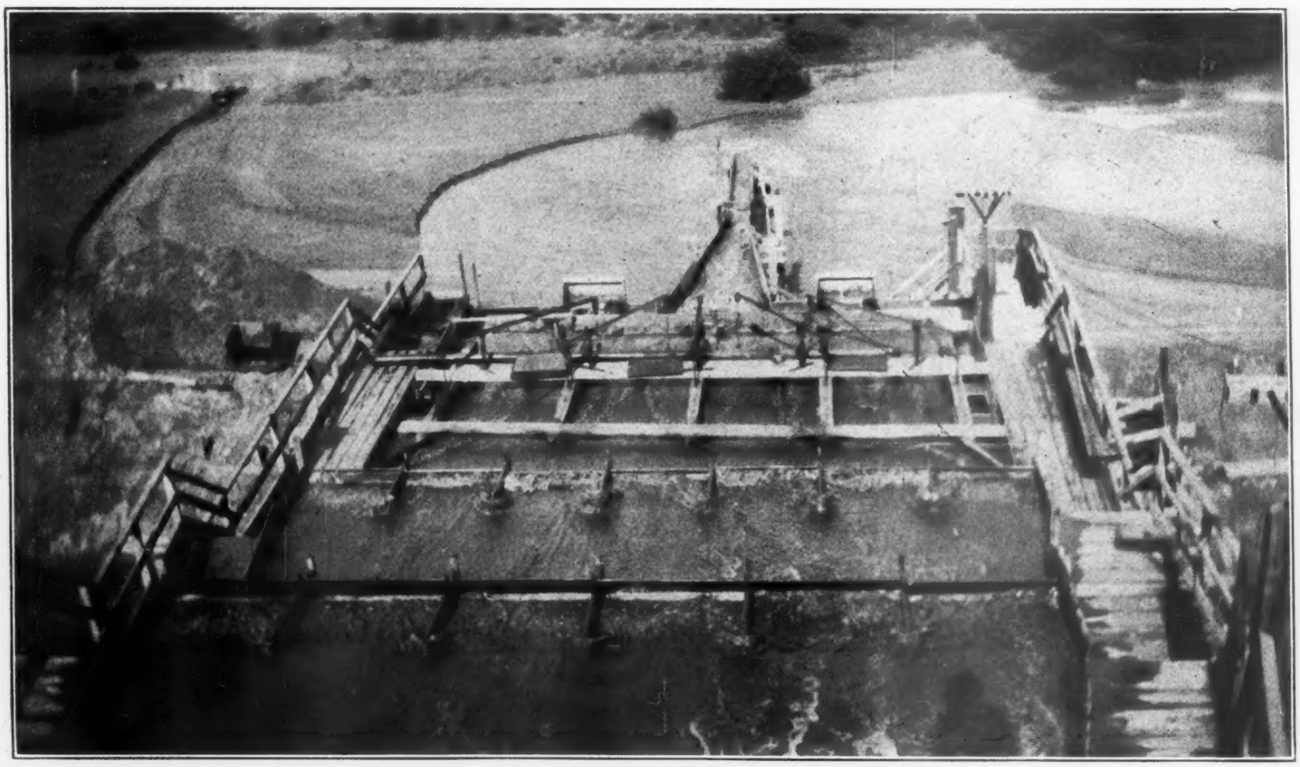
possibility the overs from the first two grizzlies are passed over two screens after the bulk of the commercial sizes has been separated. These two screens consist of a 4 inch Tyler woven screen and a 2 inch "Rolman" Manganese Steel Forge Company's woven screen. The oversizes drop into a bin from which they are taken by a cable car to plant No. 1 for crushing. The 1½ inch gravel which is thus separated drops into its proper bin.

The commercial sizes, which, together with the water, have passed the scalping grizzlies, pass over a series of stationary flat screens, supplied by W. S. Tyler & Company. These are arranged in a series of descending steps on waterfalls, and at each step a different size is separated from the mixture. Thus at the first level there is a screen which permits all sizes except the 1½ inch to drop through. This remains on top of the screen and is pushed along by the accumulation of water, sand and gravel behind it until it drops over the edge and



Looking Down from Scalping Box. In the Background Is the Overflow, and in the Foreground the Series of Cascades with Stationary Screens Described in the Text

Pipe Line from Dredge to Sizing Plant



View of Plant Number 2 Looking Down from the Top

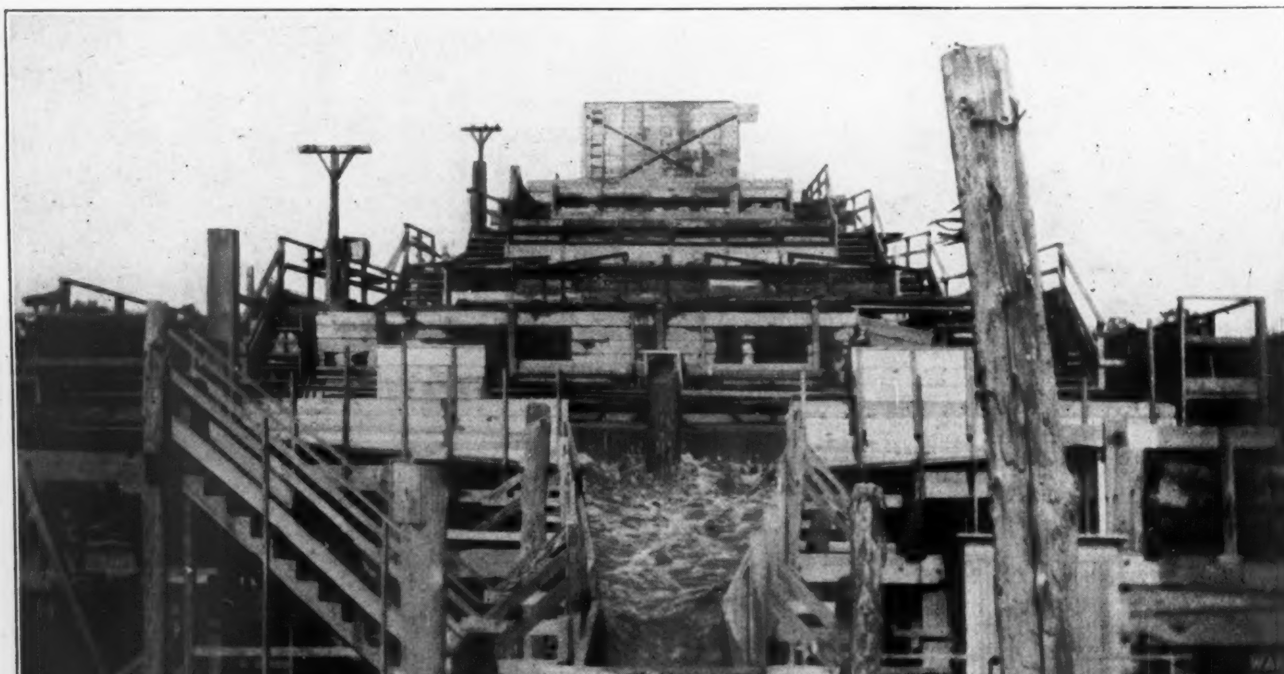
Dinkey Engine Hauling a Train of Dump Cars from the Shovel to the Crushers at Plant Number 1

Locomotive Crane in Use as a Shift Engine

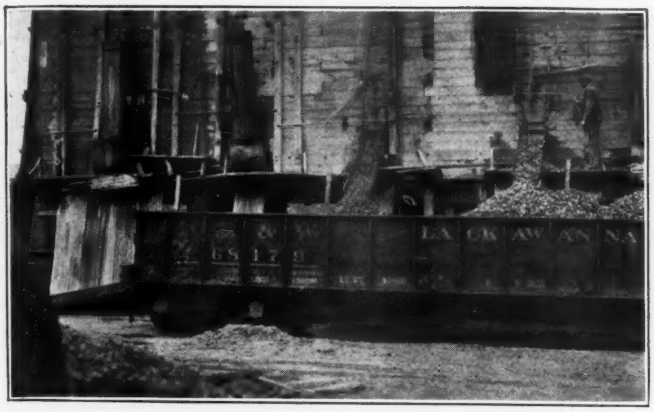
into a trough with chutes which lead into the bin for 1½ inch gravel. The mixture of smaller sizes and water which has gone through the screen descends to the lower level and down a slightly inclined plane to another screen which takes out the ¾ inch size in the same manner. The ½ inch is similarly removed at the third level, so that at the fourth level there remain only the ¼ inch and ⅛ inch sizes. At this level, which, as a matter of fact, is really an inclined plane like the others, there is first a screen of a size to permit the ⅛ inch to pass through it. This permits the ¼ inch to be washed into three 8 foot Allen tanks and one 8 foot Allen cone. The overflow goes through a trough into a pond and runs off as shown in one of the illustrations.

There is an interesting detail relating to the cleaning of the ⅛ inch size which has not yet been explained. This size often has some clay mixed with it which must be removed. Therefore, after it has passed through the screen on the fourth level it is subjected to an additional flow of clean water before passing into its storage bin. This water is provided by means of a 6 inch Worthington centrifugal pump which draws water from a well. The pump is driven by an Electric Machinery Company synchronous motor.

The storage bins at both plants are arranged so that freight cars may be run under them for loading. The bins at No. 1 plant are also so located that motor trucks as well as freight cars may be loaded. The plant is built at right angles to the loading tracks and extends over five tracks. Each bin has a capacity of approximately one carload of material, and by this arrangement cars can be loaded on all tracks at the same time. Of course, at certain times some of these bins become full, and it then becomes necessary to dispose of the surplus in storage piles. To remove this excess from the bins and later to load it into freight cars, two Browning locomotive cranes are employed. These cranes also perform the additional function



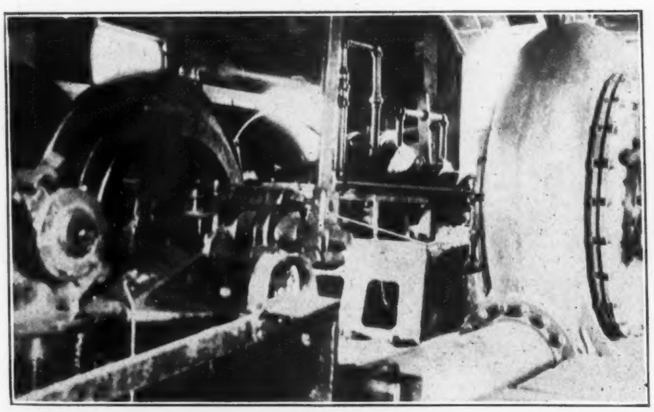
Plant Number 2 Looking Up from Lower End



Freight Cars Loading at Bins of Plant Number 1. The Plant Is Located on the D., L. & W. R. R. and Has a Complete System of Sidings

of shift-engines for moving freight cars, and in this service they perform with marked success.

The old plant, or plant No. 1, is less unusual than plant No. 2, but nevertheless is an interesting example of efficient operation. It combines crushing and sizing. The material for it is obtained from two sources. One of these is the oversize material bin at plant No. 2. This is loaded into a 5 yard dump car from a chute and pulled up a slight grade by a hoisting engine and dumped directly into the primary crusher. The other source is the Marion steam shovel which loads Easton side dump cars hauled to and from the excavation by a Baldwin steam engine. These cars are dumped onto a grizzly, made of railroad rails, which prevents occasional boulders, too large for the crusher, from causing trouble. As there is, of course, a large amount of sand and commercial sizes of gravel discharged from the dump cars which might easily clog the crusher if fed in too fast, it has been thought advantageous to provide a Stephens-Adamson feeder at the bottom of the pit under the grizzly. The feeder delivers the material onto a 30 inch conveyor belt about 40 foot centers, which delivers on a stationary grizzly with 2½ inch circular openings. The sand and small gravel going through this screen is by-passed to a conveyor under the crusher which feeds into an elevator. The rejections of this screen are delivered directly into the crusher, from which the material falls onto the second conveyor belt mentioned.



Suction Pump and Motor

Two 30x13 Farrell jaw crushers are installed for the primary crushing operation and a Simmons disc crusher for the secondary. The crushed stone is then raised by an elevator made of Hendricks buckets and Taylor-Whorton chains to a series of Link Belt revolving screens made by the Link Belt Company. The arrangement of these screens is shown in one of the illustrations. Water for washing purposes is supplied to each of these screens by a 6 inch Worthington centrifugal motor driven pump.

New Method of Burning Lime Prevents Waste

An outstanding problem in the lime industry is the profitable utilization of the small stone, known as spalls and fines. Stone under four inches in size cannot be calcined successfully in the shaft kiln, and every day thousands of tons of such stone are either entirely wasted or are sold at prices so low as scarcely to cover the cost of production. Lime is an essential commodity in the chemical, agricultural, and building industries. Lime is produced at over 400 plants distributed throughout almost every state in the Union, and the annual production value is approximately $40,000,000. Any improvement in quarrying or operation processes which will eliminate waste is, therefore, of real economic importance.

The Bureau of Mines of the Department of Commerce, through the Nonmetallic Minerals Station at New Brunswick, N. J., has given much study to possible solutions for this waste problem. It has been found that fines are successfully calcined in the rotary kiln, and that rotary kilns are gradually being brought to a higher point of efficiency, but that rotary kilns present certain serious disadvantages. Having in view the development of equipment less costly, less cumbersome, easier to manipulate and of higher fuel efficiency than the rotary kiln, exhaustive experiments have been made with a sintering machine as is used for roasting sulphide ores.

The sintering machine consists essentially of a series of travelling pallets with perforated floors. The pallets loaded with crushed limestone pass beneath a burner which supplies an intense heat, and over a suction box which maintains a downward draft to carry the flame through the charge. Complete calcination is attained in 30 to 60 minutes. Small scale tests were followed by more complete tests on a small-size standard commercial machine. A general average of all tests made gave a fuel ratio of 5.5 per cent of lime per pound of kerosene plus 5 per cent of coal which was mixed with the charge. This compares favorably with present commercial practice.

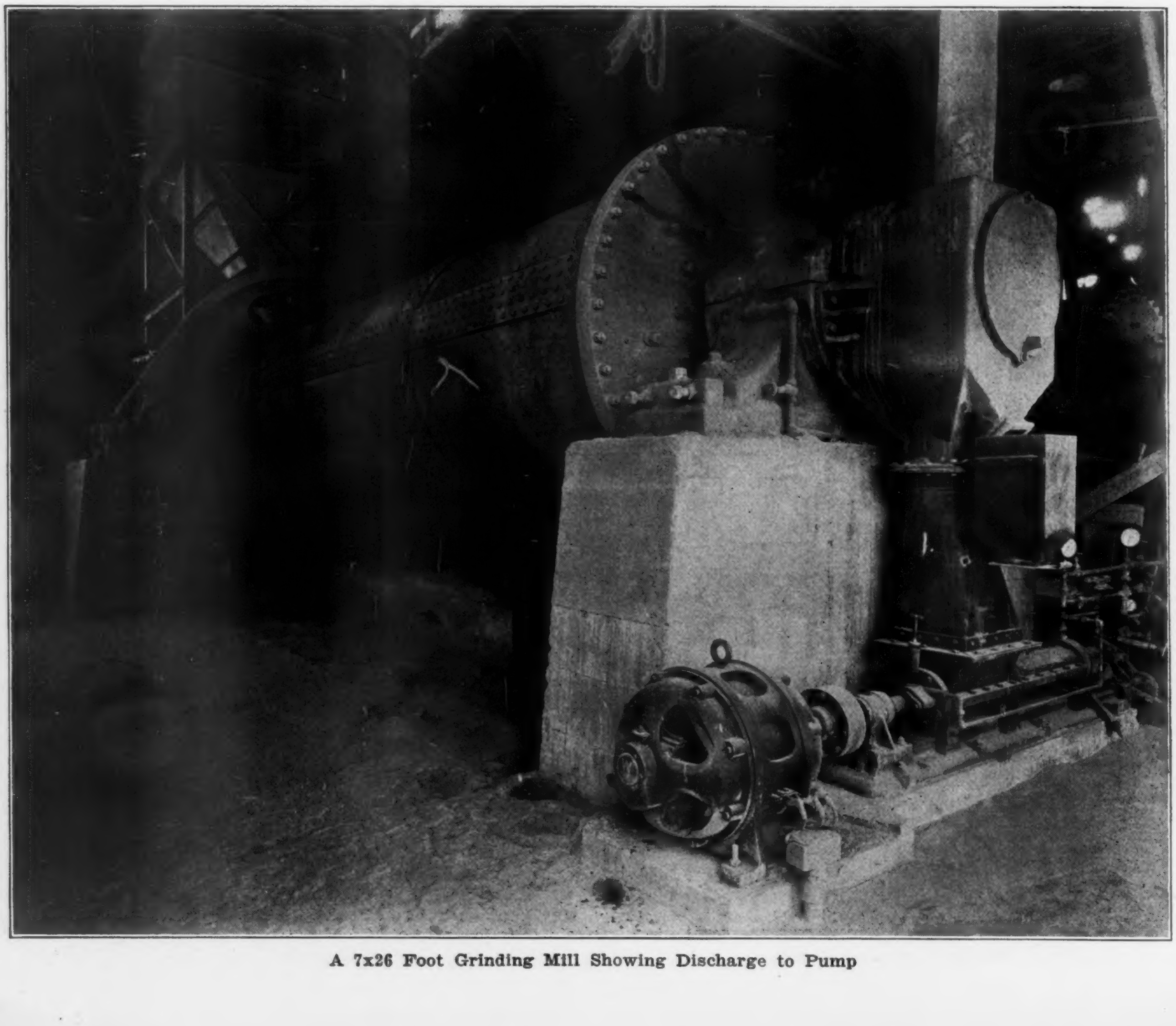
ALLENTOWN PORTLAND PUMPS FINISHED CEMENT

By Charles A. Breskin

ONE of the most important contributions to the progress of the cement industry since the invention of the rotary kiln has been the development and perfection of a system whereby pulverized materials such as coal or finished cement could be conveyed by means of compressed air thereby eliminating screw conveyors, elevators, and the dust horror that existed in the average cement plant. The latest plant to enter on a period of rehabilitation is the Allentown Portland Cement Company at Evansville, Pennsylvania. Practically the first thing to be worked out was the elimination of the screw conveyors which delivered cement from the finish grinding department to the stockhouse and then to the packhouse. Conveying with screw conveyors meant considerable leakage of cement which when considered over a period of time amounted to a considerable item. In addition to the loss of cement, leakage in screw conveyors made cleanliness and good working conditions for employees impossible.

The preliminary grinding of clinker at the Allentown plant is done with three Fuller mills. The material is then delivered to two 7x26 foot single compartment Traylor mills. The discharge from the Traylor mills, formerly sent to screw conveyors, now discharges directly to two 6 inch Fuller-Kinyon pumps. Each grinding mill is served by one pump, each direct driven by a 30 h.p. Westinghouse motor. The Fuller-Kinyon pump is particularly well adapted for this class of work. A comparison of some of the accompanying illustrations, particularly the contrast between pipe line and screw conveyor, each of which did the same work, leaves little doubt as to the results secured.

While the Fuller-Kinyon pump has long been in use in the cement industry for conveying pulverized coal, it is only in recent years that it has been adapted for materials other than coal, and its progress has been so marked, that it may not be amiss to briefly describe its principle of operation. The theory of the Fuller-Kinyon system is that of filling the interstices between particles of pulver-

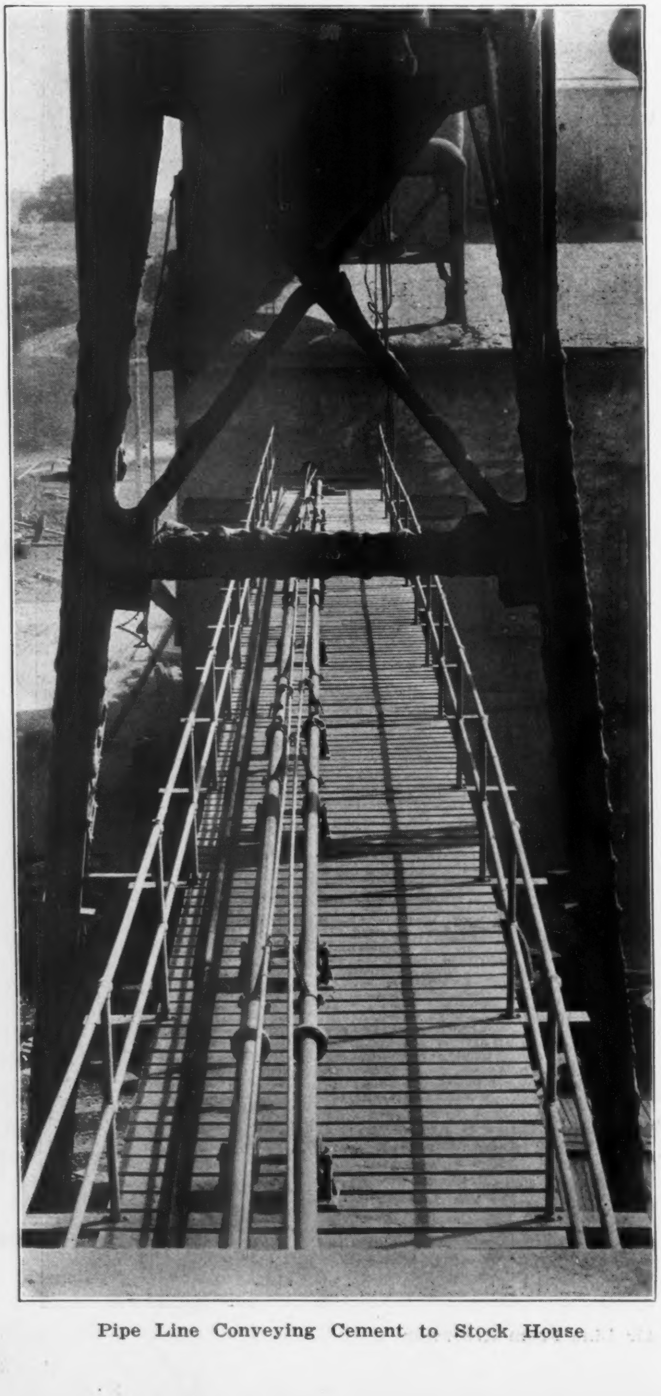


A 7x26 Foot Grinding Mill Showing Discharge to Pump

The Screw Conveyor Which Formerly Carried Cement

Side View of Pump Showing Air Line From Reservoir ized material with air, the air acting as a puffer or filler to separate the particles from one another and thus prevent the material from packing. The pump consists of a worm or screw revolving in a closed casing or barrel. It is fed by gravity and the feed is carried to the discharge end of the screw where it is aerated. The introduction of air to the interstices actually produces a fluid condition of material and it really flows like water.

It has been found in handling materials like cement that a certain velocity of the aerated materials must be maintained in the pipe to insure continued intimate operations. It has also been found that there is little or practically no wear of the interior of the pipe lines or conduits through which the cement is pumped. This is due to the fact that above certain velocities the air and cement is agitated and really becomes a liquid mass in which the heavy particles are rolling over and over on the lighter particles of air. The air in a measure acts as ball bearings for the heavier particles with the result that there is only rolling friction in the pipe line instead of a sliding friction. This action accounts for the very slight wear on the interior of the pipe lines through which the cement is pumped.



Pipe Line Conveying Cement to Stock House

At the Allentown plant the two 6 inch Fuller-Kinyon pumps deliver the cement from the grinding mills to the stockhouse through a 3 inch line, 350 feet long. This length of pipe line replaced an equal length of screw conveyors and elevators. The capacity of the pumps is 100 bbls. of cement per hour or better. It was mentioned previously that preliminary finish grinding is done with three Fuller mills. The equipment consists of two 57 inch mills and one 70 inch mill. A 6 inch Fuller-Kinyon pump takes the discharge of all three mills and delivers to finish grinding mills or direct to the stockhouse. The latter is used only when the Fuller mills are converted to finish grinders by a change of screw. In cases of emergency this is sometimes done.

At the present time the Allentown Portland Cement Company is constructing a silo stockhouse which will take the place of the present bulk stockhouse. The bulk stockhouse will be used only as an auxiliary unit. Underneath the silo stockhouse will be installed the latest type Fuller-Kinyon portable pump which will deliver direct to the packer bins. This system also enables withdrawing cement from any silo and distributing the product to any one or all of the silos when the packing house is not running. In the packhouse proper, a special arrangement was made for truck loading. For this purpose a 6 inch Fuller-Kinyon pump was installed, which delivers the cement direct to the truck loading bin. To recover the spill from all the packers, a 4 inch Fuller-Kinyon pump was installed which delivers the spill back to the packing bins.

Safety Codes Progressing

Progress has been made on some 50 safety codes applicable to factories; and codes for paper and pulp mills, elevators and escalators, and for manufactured gas, were completed and approved during the year. Nineteen standardization projects dealing with the mining industry are now under way. A very important code covering the rock dusting of coal mines to prevent the coal-dust explosion hazard was recently approved. The casualty mine insurance have announced through the associated companies that they will in future not issue compensation policies on gaseous or dusty mines that are not rock-dusted, and that after October 1st they will cancel policies already in force on such mines.

NEW JERSEY COMPANY DREDGES SILICA SAND

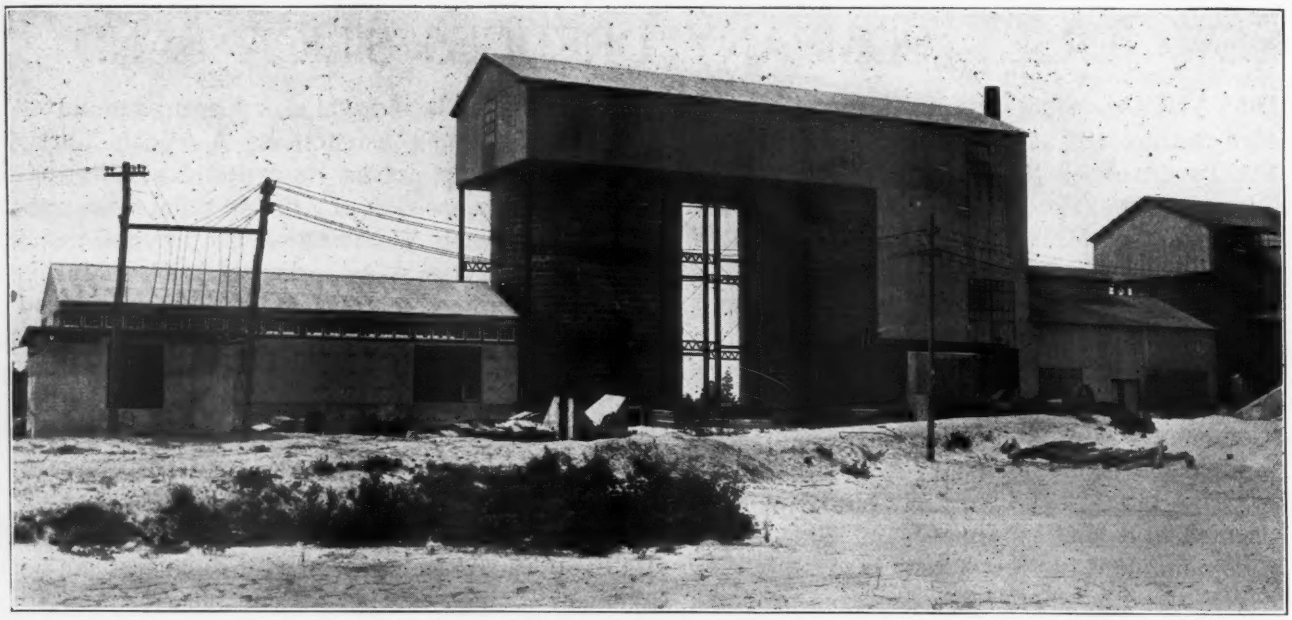
SUBSTANTIAL construction and excellent design characterize the new silica sand plant of the Tavern Rock Sand Company, near Millville, New Jersey. The plant is located about 4½ miles southeast of Millville. The company offices are located at Bridgeton, New Jersey, about 17 miles away. This new plant dredges the silica sand which is pumped to a steel and concrete washing and screening plant and later stored in silo bins built of burned clay hollow tile. The Tavern Rock Sand Company was organized in the State of Missouri and has been doing business in the middle west for 37 years. They own three plants in Missouri located at Klondike, Pacific and Gray Summit. The new plant in New Jersey is entirely different from the others, as it is a dredging proposition while the Missouri plants are all quarry operations.

The property for the new plant covers a large area of high grade silica sand. In testing the ground before the plant was constructed, many samples analyzed indicated that the sand would run 99.5 per cent silica. Some of the sand was removed without washing and used in the manufacture of chemical glassware with excellent results. It is not likely, however, that the whole deposit will contain such a high grade sand. All of it can be washed and cleaned so that it will make an unusually pure sand for glass, silicate of soda, etc. The deposit also contains large quantities of strong moulding sand, gravel and core sand.

The material is excavated by a dredge 20x40 feet and of sound construction. A 6 inch Morris centrifugal pump driven by a 100 h.p. Westinghouse variable speed A. C. motor pumps the material. A 3 inch Worthington centrifugal pump driven by a 5 h.p. Westinghouse A. C. motor is used for priming the Morris pump, water seal and jetting which are used in breaking down the bank. The sand is pumped through an 8 inch pipe line to a rotary screen from which the oversize and debris are removed. The material passing the screen drops into a settling box from which it is removed by valves and troughs and delivered to Lewistown washers. These washers are of the worm type, and the units are so constructed that one set can be taken out of the operation without interfering with the second set. A 20 h.p. Westinghouse A. C. motor drives the washers and the sand is discharged from the washer boxes to a conveyor belt which carries the dewatered sand to a vertical height of 40 feet and then horizontally for 40 feet and discharges to a drain pile. The water used in washing is produced from a well of absolutely clear water by a Worthington "axiflo" pump driven by a 30 h.p. General Electric A. C. motor at the rate of 500 gallons per minute.

The sand, when discharged by the conveyor belt from the washers, drops to a drain pile. A concrete tunnel with openings in the top runs through this pile. A 30 inch conveyor belt 500 feet long in the concrete tunnel receives the sand through

The Pump Line to the Plant and the Waste Pipe Discharging

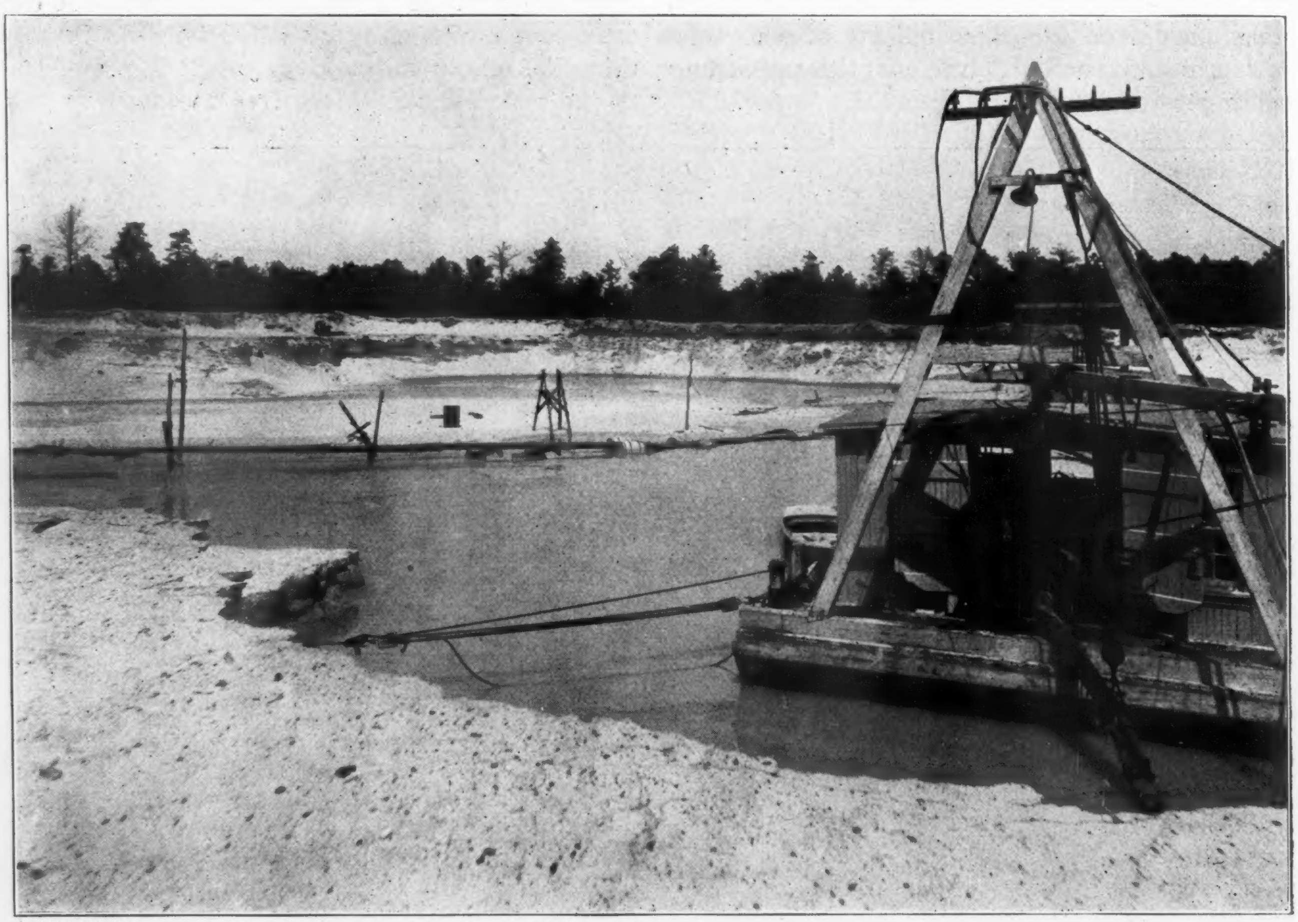


The Two Hollow Clay Tile Storage Bins for Final Storage

the top of the tunnel after it has been partly air dried and delivers it to a hollow tile bin 30 feet in diameter and 32 feet high. The belt conveyor is operated by a 15 h.p. Westinghouse A. C. motor.

A reciprocating feeder removes the sand from the hollow tile bin and discharges to a 30 inch belt conveyor which in turn discharges to a bucket elevator that feeds an oil fired rotary type dryer designed and constructed by the Tavern Rock Sand Company. After the sand passes through the dryer, it emerges perfectly dry and is discharged to a bucket elevator that delivers to two Link Belt vibrating screens. The oversize is discharged to hoppers while the screened sand drops to a belt conveyor which in turn discharges to a bucket elevator after which the sand is either spouted or conveyed to the dry sand hollow tile bins.

The hollow tile storage bins or silos are con-



The Dredge and the Pipe Line Supported on Pontoons structed of burnt clay tile. Each row of tile has 5 hoops which are grouted in with concrete. The wet sand bin is 30 feet in diameter and 32 feet high, while the dry sand bins are 30 feet in diameter and 40 feet high. Two Keeler 125 h.p. boilers were formerly used for furnishing the steam power for generating electricity. Now the current is purchased from the Electric Company of New Jersey as recently their high tension lines were brought through this section of New Jersey. One of the boilers is now used for steam atomizing the oil used in the dryer. The Tavern Rock Sand Company contemplates installing an air compressor for this purpose, eliminating the use of boilers except during the winter months.

This pumping and washing plant has a capacity of about 50 tons per hour while the drying plant has a capacity of 30 tons per hour. With the large storage bins for wet sand and the almost unlimited storage space for dry sand the Tavern Rock Sand Company is in an excellent position to give service. The washing plant is of frame construction, but the boiler house and mill are all steel, concrete and corrugated iron. The officers of the company include G. M. Levis, president; R. H. Levis, secretary-treasurer, and A. L. Cummings, vice president. L. L. Stokes is in charge of this new plant.

DO GOOD ROADS PAY?

Authorities who have made careful experiments covering a period of years say that the average motorist will save 2½ cents a mile by traveling on a smooth instead of a rough road. This saving takes into account only the obvious factors such as car depreciation, tire mileage, gasoline and oil consumption, and similar items.

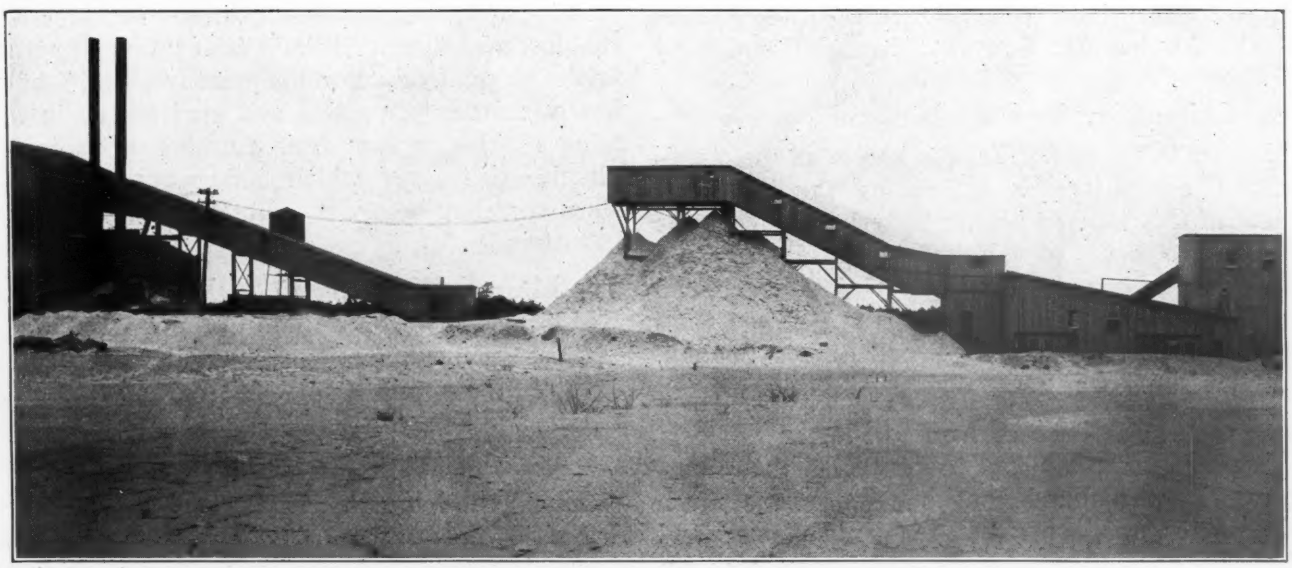
Assuming that each motor owner travels 5,000 miles a year, and that half of that, or only 2,500 miles, is on rough roads, we find that our twenty million motorists are enduring fifty billion miles of rough travel.

July Business Failures Large

The business and financial failures or suspensions in July were the highest both in number and liabilities for any July during the last thirty-four years, according to figures reported by Bradstreet's. There were 1,661 suspensions or failures in July and 1,574 in June, an increase of 5.5 per cent. In July, 1925, there were 1,451, making this year's increase 14.4 per cent. The liabilities totaled $89,857,178 in July, as compared with $49,342,805 in June, an increase of 82 per cent, and $31,796,451 in July, 1925, an increase of 181 per cent. The total assets reported were $66,817,987, $29,408,926, and $16,110,489, respectively.

A comparison of failures, assets and liabilities in July for a period of years follows:

	Number	Assets	Liabilities
1926	1,661	$66,817,087	$89,857,178
1925	1,451	16,110,489	31,796,451
1924	1,548	30,486,735	49,539,184
1923	1,405	20,362,083	40,220,398
1922	1,575	20,708,453	43,120,289
1921	1,491	43,055,551	70,153,567
1920	593	35,877,489	50,333,493
1919	417	4,049,501	7,881,098
1918	771	6,298,568	12,868,600
1917	1,050	11,722,383	17,089,053
1916	1,164	4,627,261	10,100,412
1915	1,443	7,914,347	15,420,950
1914	1,219	19,292,236	30,545,567
1913	1,065	39,374,368	55,253,745
1912	1,073	7,080,138	13,533,304
1911	927	5,213,438	9,371,571
1910	865	8,935,928	17,042,781
1909	946	3,968,656	8,341,045
1908	1,152	11,457,396	22,315,172
1907	733	8,716,782	13,931,290
1906	704	3,793,099	7,185,317
1905	705	5,899,448	10,481,204
1904	774	3,586,980	7,219,212
1903	718	4,342,412	9,785,882
1902	772	3,084,500	6,754,475
1901	841	8,498,290	15,120,204
1900	819	4,170,491	9,458,257
1899	744	1,912,746	5,753,048
1898	965	5,085,456	9,796,419
1897	1,037	5,201,117	9,266,690
1896	1,203	9,806,749	17,321,664
1895	1,135	7,245,531	12,373,257
1894	993	4,674,844	9,123,805
1893	1,892	77,663,842	89,559,384



The Washing Plant at the Right. The Drain Pile in Center

PIT AND QUARRY FOREIGN DIGEST

Portland Cement and Sulfuric Acid from Gypsum

This note based on data from German publications relates particularly to the buyer of cement clinker from gypsum, clay and coal. Gypsum takes the place of limestone in the ordinary processes, and instead of liberating carbon dioxide (from limestone) liberates sulfur dioxide (from gypsum); the sulfur dioxide is converted to sulfuric acid. Note by abstractor—such a process will in the not too immediate future have a value in certain sections of the United States when the present supplies of brimstone give out or become too expensive. The urge to such a process will come not from the cement maker or user, but from the sulfuric acid producer. (The Chemical Age, July 3, 1926, page 7.)

Cements of Slow Set and Rapid Hardening Combined with Great Strength

Describes attempts in Belgium, Holland, Switzerland and Germany to compete against aluminate cement. Belgium produces an aluminous cement (La Société des Centrales Electriques des Flandres et Langerbrugge). All these countries are producing some type of super-portland cement. The first was the Holderbank brand in Switzerland. Holland is producing "Dobbel" portland cement, Germany "Edel" (super) portland cement, and Belgium Superciment J. Van den Heuvel. (G. Magnel in La Technique des Travaux, Brussels, No. 6, June 1925, through Le Ciment.)

Theory of the Hardening of Hydraulic Cements

The author's theory is that the initial hydration of the anhydrous constituents produces colloidal hydrates. The crystalline gel thus produced is transformed into an aggregate of coarser crystals because of the greater solubility of the crystals of smaller dimensions. (Baykoff in Comptes Rendus of the Academy of Sciences, through Le Ciment 1926.)

China Clay for Porcelain and Pottery

Refers to the use of Zettlitz kaolin as the standard of comparison in estimating the industrial value of this type of plastic material. It contains 95-99 per cent of aluminum silicate. Actual analyses and physical properties of this material are given as well as firing properties. (The Chemical Age—The China Clay Trade Review Section, July 17, 1926, page 8.)

Adherence of Iron to Plaster

Report on experiments to determine the adherence. It was found that adherence was much greater to dry plaster than to humid plaster, and that iron rods well rusted gave higher values than bright rods, painted rods or rods coated with cement slip. (Anstett, Rev. mat. constr. trav. pub. vol. 198, page 86, 1926.)

Notes on Clays Used for Bricks

These notes refer only to clays used as raw material for common brick and not as raw material for refractory and ceramic materials. Gives analyses, the function of each constituent in the clay complex and the physical properties which render each constituent useful in making bricks. The causes of color and the means of producing color in bricks are given as well as a sketch outline of the steps involved in brick manufacture. (J. N., Le Ciment, 1926, page 21.)

The Evolution of the Rotary Kiln

A brief history of the rise of the rotary kiln to its present position of importance and a forecast of the future tendencies in kiln construction. (N. C. Kyriacon, Le Ciment 1926, page 24.)

Recovery of Heat in Cement Plants

Considers the possibilities of producing savings in the dry or wet processes of cement manufacture by increasing the kiln length and finds this to be ineffective. However, the gases can be used to generate steam sufficient to provide all power needed in the plant. There are incidental operating advantages which result. In the wet process a somewhat shorter kiln than now used would give a power output only 5 to 6 per cent less than the dry process. (M. Rey, Le Ciment, 1926, page 131.)

Reinforced Concrete in Internal Navigation

Gives data with illustrations as to building of dams, locks, bridges, auxiliary structures in river, canal and harbor work, and for floating structures. (P. Vidal, Le Ciment, 1926, page 158.)

Fractional Fusion of Refractories

It is shown that fusible materials introduced in coal ash may flux with the silica content of refractories at relatively low temperatures and lead to impoverishment in silica and enrichment in alumina at the surface thus forming a protective alumina-rich layer which disappears slowly, the silica traveling before it. (R. Hustin in Chimie et Industrie.)

The Mineralogy of Certain Calcium Aluminates Occurring in Aluminate Cement Clinkers

Gives analyses, various physical and chemical data, 2 figures and 7 photomicrographs. (C. W. Carstens in Zement, No. 19.)

Dolomite Cements

Considers dolomitic magnesian cements, true dolomitic limes, mixed dolomitic limes and true dolomitic cements. Describes method of winning, properties, uses, strengths, etc. (O. Kallauner in Zement, 1926, No. 19.)

Pigments Used for Coloring Cement

Gives the conditions which colors must fulfill, namely, fastness to cement, lime, light, and weather, and the ease of miscibility, etc. Gives for white, lithopone; for black, boneblack, carbon black, and graphite; for yellow, the pure natural ochers; for brown, the brown ochers, raw and burnt ochers, burnt siena and the red iron oxide colors; for blue, ultramarine; for violet, manganese violet and cobalt violet. Gives method of testing colors for cement purposes. (Walter Obst in Zement, 1926, pages 325 and 344.)

Calculation of Raw Mixes for Cement

Gives formulae, examples, etc., for obtaining desired composition in finished product from 2 or from 3 raw materials of known composition. (H. Nitzche in Zement, 1926, No. 20.)

The Production of Super-Portland Cement in Rotary Kilns

Gives operating details on the production of high grade portland cement, the precautions necessary, the raw materials, and the results obtained in strength tests. Compares the product as to quality and cost with the product of the rotary kiln. (August Bues in Zement, 1926, No. 24.)

The Particle Size of Portland Cement Flour and Its Influence on the Velocity of Hydration

An extremely important research on the exact separation of portland cement flour into close fractions based on particle size. The fractions were tested chemically and physically. Numerous tables and illustrations. (Albert Hauenschild in Zement, 1926, No. 26.)

Reducing Atmosphere and Color Changes in the Sintering of Portland Cement

Reduction even to iron can occur, but the color changes are not due to the degree of reduction. They are due to the presence of free iron oxide, which in turn depends on rapid cooling of the charge. (Dr. Hans Kühl in Zement, 1926, page 456.)

Tests of Stucco Plasters (Keene's Cement)

The author finds their special properties to be:

1. A much slower set.
2. A considerably more rapid hardening.

(J. Clementel, Le Ciment, 1926, page 53.)

The Constitution of Lime Cements

The authors consider the theories proposed from the time of Smeaton. The formulae of the various important constituents found or assumed in the lime-containing hydraulic cements are discussed. (L. Marino and F. Ferrari in Il Cimento and Le Industrie Costruttive, Metallurgiche e Minerarie, through Le Ciment, 1926.)

Influence of Cold on Mortars

Cold produces a two-fold effect, a mechanical or physical effect and a chemical effect. The first results from the freezing of water in the pores, with consequent volume increase. Calcium chloride solutions are sometimes used because of their lower freezing point and minimum deleterious chemical effect on the cement to prevent freezing and its consequences. The chemical effect is the commonly known one that lowering of temperature retards or inhibits certain reactions. This effect may be felt at temperatures above freezing. Tests at 34°-37° F. gave 28 day strength figures much inferior in all cases to the corresponding figures for the 7 day tests at 59° F. and frequently inferior to the 2 day figures. (Anstetee, Le Ciment 1926, page 86.)

Refractory Hydraulic Cement

Attempts have been made to prepare a cement with good setting properties, and capable of withstanding high temperatures without deterioration, using mixtures based respectively on portland cement, magnesia cements, and aluminous cements. The last alone proved suitable as a basis for a refractory cement, the mixture most nearly satisfying the requirements consisting of 1 part of aluminous cement (ciment fondu) and 2 parts of calcined and powdered bauxite. This gives a cement which sets slowly and hardens rapidly, and undergoes only slight shrinkage on heating. It softens, however, at 1350° to 1400° and melts at about 1600°. Mixed with crushed refractory material in the proportion of 1 to 3 parts of crushed refractory to 3 parts of cement, it gives a concrete which is not affected by rapid changes of temperature. After heating to 1000°, the cement and concrete exhibit a certain degree of friability, but this disappears again on heating to 1250°. The manufacture of this cement (ciment Kestner) is now being undertaken in France. (J. Arnould in Chim. et Ind., 1926, 15, 184-188.)

Brick Making

In the kiln-burning of bricks, a portion of the evolved hydro-carbon gases is drawn off at a part of the kiln which is sufficiently hot to prevent condensation on the bricks. The whole or a part of the gases so drawn off is returned to the combustion zone of the kiln, where it is burnt with the aid of added air. Where there is an excess of hydro-carbons over that required to heat the kiln, it may be utilized for other purposes, or it may be cooled in order to condense part or all of the hydrocarbons. (H. M. Ridge, E. P. 247, 325, 28.11.25.)

Rapid Determination of Silica and Lime in the Raw Mixture for Blast-Furnace Cement

Silica is determined by evaporating the powder with concentrated hydrochloric acid, treating the residue with dilute acid, filtering, and weighing. The filtrate is made alkaline with ammonia and then acid with acetic acid. Iron and aluminium are precipitated as phosphates and, without filtering, calcium is precipitated as oxalate. The combined precipitates are purified by redissolving and precipitating, and are finally dissolved in sulphuric acid and calcium determined by titrating the oxalic acid with permanganate. (F. Steumpf in Z. angew Chem., 1926, 39, 278-279.)

Manufacture of Portland Cement from Molten Slag from Gas Producers and Furnaces Fired by Pulverized Coal

Lime, silica, ferric oxide, alumina, and gypsum are added, in the proportions required to form portland cement, to the molten slag before it is tapped off from the slag chamber. The added substances may be introduced, together with fuel and air, through nozzles provided with several concentric outlets or through simple nozzles. (G. Polysius, . P. 421, 427, 20.4.22.)

Rapid Determination of Lime in Cement and Raw Materials for Cement

0.3g of the ignited material is treated with 5 c.c. of fuming nitric acid on the water bath, and after evaporating the excess of nitric acid, an excess of powdered oxalic acid crystals is added and the mixture heated gradually in an electric furnace, finally keeping at 500° to 550° for 20 to 30 minutes. After cooling, the material is transferred to a calcimeter. (H. Kühl and F. Klasse in Zement, 1926, 15, 181-184.)

Fineness of Particles of Cement, Especially Iron Portland Cement

The finest particles in cement have generally a higher percentage of lime and gypsum than the larger particles. Of two iron portland cements, the one which was the finer by sieve analysis showed the lower strength, but use of a 10,000 mesh sieve showed that the other had the larger proportion of very fine particles. Sedimentation in the Bauer apparatus is necessary for the quantitative determination of the finest particles. (A. Guttmann in Zement, 1926, 15, 164-168, 185-187, 200-203.)

Manufacture of Aluminous Cements, Colored or White

The aluminous cement mass, very finely ground and very intimately mixed, is roasted for a long period (6 to 8 hours) at a temperature well below the softening point (1000-1100°). White cement is produced by the use of white bauxite and pure lime. (U. B. Voisin, E. P. 248, 281, 14.10.25.—Addn. to 243, 876.)

Manufacturing Cements (Plaster) from Overburnt Gypsum, Overburnt Gypsum Waste, or Natural Anhydrite

A hard-setting plaster is produced, without the necessity of employing any simultaneous or subsequent heat treatment, by mixing the raw material intimately with the appropriate amount of acid alkali sulphate, e. g., sodium hydrogen sulphate or potassium hydrogen sulphate, or neutral alkali salt together with the requisite amount of sulphuric acid. (P. P. Budnikov and M. E. Lewin, G. P. 320, 957.)

Induration or Mineralization of Organic Matter

Fibrous organic material, either moistened or washed with a weak solution of an alkali or of an acid, is treated with a dry hygroscopic chemical which reacts exothermically with water, such as dry caustic soda preferably in flakes, or dry caustic lime, or magnesium chloride, and mixed, while heat is still being evolved, with cement, mortar, and the like to produce on setting a light form of concrete which can be moulded under pressure. (C. D. Burney, E. P. 349, 899.)

Cement Objects Having Polished and Translucent Surfaces

Special aluminous cements, containing less than 1.5 per cent of iron, e. g., composed essentially of monocalcium aluminate, are used in contact with polished moulds to form articles having a polished and somewhat translucent surface, which may be colored or decorated. (Soc. "Lap" Assees. of S. Seailles, E. P. 234, 846, 29.5.25.)

Kiln for Burning Cement and for Similar Purposes

An automatic shaft furnace is constructed so that the raw material together with the fuel is blown in from underneath, and the completely burnt material, owing to its increased specific gravity, falls and leaves the furnace at the inlet for the mixture, while the incompletely burnt material leaves at the top of the furnace together with the combustion gases and is collected in a dust chamber and returned to the furnace to complete the burning process. (C. Naske, E. P. 227, 444.)

Rotary Kilns for Burning Cement, Ore and Similar Materials

In a rotary kiln, a heat-recuperating device is attached to the lower or clinker outlet end of the main rotating cylinder, and is so constructed that the clinker moves in circuitous passages countercurrent to the incoming air for combustion.

Manufacture of Aluminous Cements

To the initial materials small amounts of alkali salts (as chlorides, sulphates, carbonates, silicates, or aluminates), calcium chloride, calcium fluoride, or cryolite are added, and the mixture is heated to fusion, sintering, or to a temperature at which neither fusion nor sintering occurs. The addition facilitates the formation of hydraulic products which set more rapidly than the untreated material. (E. Martin, F. P. 597,978.)

Manufacture of Cement

Clinker rich in lime is quenched with water, the powdery portion is separated, and the lumpy portion ground and again mixed with the powder. Blast-furnace slag is added, and the mixture dried or completely slaked, as desired. Alternately, clinker rich in lime or hydraulic lime may be slaked by means of moist, granulated, blast-furnace slag. (H. Loescher, F. P. 599,104 and 499,507.)

Cement is manufactured in vertical kilns, a portion of the raw material being moistened with a paste made by mixing raw material with water. (Soc. E'Exploit. Des Proc. Ind. Canalot, F. P. 599,286.)

Gypsum, or other suitable material containing calcium salts, is incorporated with cement clinker in two or three stages, 2 to 3 per cent being added at each stage and ground thoroughly with the clinker. In this way a comparatively high percentage of gypsum can be added, reducing the setting time and increasing the compressive strength and yet reducing the volume expansion. (Le Chatelier test.) (K. P. Billner, from M. Lantz, E. P. 247,097.)

Manufacture of Porous Building Material for Insulating Purposes from Coal Slack, Etc.

A mixture of coal washings, shale, etc., is ignited and burnt in specially constructed chambers without the addition of further fuel or the application of external heat. In order to maintain a sufficient temperature, oxygen or oxygen mixed with air is introduced under pressure. For the purpose of quick building the mixture is charged into the annular space between outer and inner refractory walls, and fired as described. (W. Neuhaus and E. Opderbeck, G. P. 412,071 and 421,072.)

Manufacture of Magnesia from Crystalline Magnesites for the Production of Sorel Cement

Definite proportions of finely ground and lump magnesite are mixed and heated for a prolonged period at a definite temperature above the decomposition temperature of magnesite. The product contains, in addition to highly basic magnesium carbonate which sets rapidly with solutions of magnesium chloride or magnesium sulphate, deadburnt magnesia which sets very slowly and increases the stability of the cement. (Austro-Amer. Magnesite Co. [Oesterr.-Amer. Magnesitges.] Austr. P. 101,328.)

Binding Together Blocks for Pavements, Roads and the Like

A mortar for binding road or building materials together is composed of 20 parts of cement, lime, plaster of paris, or the like, mixed with 80 parts of a bituminous soap which contains at least 50 per cent of bitumen and which is made by saponifying fatty material in presence of bitumen (cf. E. P. 233,371; B., 1926, 14). The mortar may also contain 10 to 10 parts of pulverized rubber (if rubber paving is being dealt with) or 10 to 20 parts of sand or stone dust. (L. S. van Westrum, E. P. 247,238.)

Therma Investigations on Blast-Furnace Slags

The hydraulic properties of blast-furnace slag depend on the development of a vitreous product, which passes into the crystalline form when heated to about 800°, with the evolution of heat, the heat evolved during this transition is not a direct measure of the hydraulic properties of the slag cement, except with slags of the same composition, but depends on the extent of vitrification, and may therefore be used as an exact method for comparing the efficiency of various granulation processes from the point of view of the hydraulic properties of the slags. Thus, preliminary cooling of the molten slag before granulation, and overheating of the slag gives a low vitreous content and poor hydraulic properties; air granulation, although giving less vitrification than the wet process, produces slag more active chemically and having the better hydraulic properties. Calorimetric determination of the heat of solution of slags of similar composition gives a more exact comparison of the energy content, i. e., extent of vitrification, than a microscopical examination can give. The heat of hydration of a slag may be calculated from the heat of solution of the slag after deducting the heats of solution of the hydroxides produced by complete hydrolysis; the relative proportions of these can be determined from the chemical composition of the slag. The heat of hydration, however, bears no direct relationship to the hydraulic properties of the slag. These depend chiefly on the chemical composition of the material, e. g., in portland cement the heats of solution and hydration present, while the dicalcium silicate and fluxes affect the setting of hydraulic properties of the cement. The energy contents of the single components of three or four component systems, such as the various types of blast-furnace slag, are most conveniently studied by the determination of the heat of solution, which gives a more accurate knowledge of the physical nature of the slag, e. g., extent of devitrification, than a microscopical examination. (R. Grün in Mitt. Forschungsinst. Huttenzement—Ind., 1925, Reprint. I. Latent energy of blastfurnace slags and the single components of the three-component system silica-lime-alumina, 20-39.)

Kiln (with Electric Heating for Lime Burning, Etc.)

A kiln for burning lime, magnesite, cement, or the like, consists of a circular rotating horizontal hearth covered with a dome and sealed by a sand or liquid seal. The material to be treated is introduced onto the periphery of the hearth and is heated by several electric arcs arranged around the hearth or by radial resistances. The heat-radiating surface may be increased by providing partitions between the arcs or resistances. At intervals the heated material is impelled to the center of the hearth, where it is withdrawn. The inlet and outlet valves and the rakes for impelling the material toward the center of the hearth may be coupled mechanically, so that they work in unison. (Siemens U. Halske A.-G., Assees. of R. Gross and M. Stadlhuber, G. P. 416,143, 22.2.22.)

Three-component System Lime-Silica-Alumina and Hydraulic Binding Materials

Ceramic bodies and cementitious materials consist essentially of lime silica and alumina; the cementitious or hydraulic properties of the binding materials depend on their lime content, as represented by the calcium aluminates and calcium silicates present. The calcium aluminates, which harden very quickly, are the most important constituents of aluminous cements and high alumina blast-furnace slags, while the calcium silicates present determine the slower setting of portland cement and blast-furnace cements. No hydraulic binding materials are known which do not contain lime. (R. Grün in Zentr. Bauverwalt., 1926, 46 [1].)

Utilization of Freshly Made, Hot Cement

Blast-furnace cement, still hot from the grinding mills, shows no reduction in strength compared with cement which has been allowed to mature for some time before use. Similar results are to be expected with portland cement. This disproves the view generally held that the use of freshly made, hot cement is dangerous from the strength standpoint. (R. Grün and W. Muth in Baumarkt, Leipzig, 1925 [5].)

Lumnite Cement Aids Elsberg in Raising Submarine

On Friday evening, July 23, at the Engineer's Club, in New York City, an assemblage of many interested in his engineering and scientific problems dined with Commander Elsberg, and his assistant, Lieut. Kelly, to listen to his explanation of the difficulties which he met in raising the submarine S-51.

For two hours Commander Elsberg held his audience by a story that was as dramatic as it was educational. Commander Elsberg told of burning away portions of the steel deck of the submarine with torches 135 feet under water; of washing tunnels with a fire stream through hard clay under the submarine, the tunnels only large enough for a diver to lie prone in; of one of these tunnels caving in back of the diver and of his washing space in which to turn and then washing his way out through the cave-in.

Of particular interest to engineers and construction men who have at times used cement grout in their construction work was Commander Elsberg's description of making the undamaged compartments of the submarine tight so that the water might be expelled by compressed air. To effect this, the speaker pointed out that scores of valves inside of the submarine had to be closed by divers. This was done after a thorough schooling and rehersal on a sister ship, the S-50. Two large flap valves on 24 inch ventilating ducts offered a serious problem, as it was impossible to fasten these valves closed against an internal air pressure.

After all attempts to seal the two large valves by fastening the flap shut had failed, it was decided that they could be sealed only by filling them from the surface with some material which would solidify and make them air tight. Experiments under similar conditions with a number of materials, including the ordinary cements in common use, showed these materials to be not entirely satisfactory or sure of success. Experiments with quick hardening lumnite cement showed that this war time product would harden quickly under the deep sea conditions involved. After Commander Elsberg determined this, divers inside the submarine tapped holes in the large valves and attached 1¼ inch valve connections for a heavy rubber hose leading out of the submarine and up to the rescue ship "Falcon." On board the "Falcon" the lumnite cement was mixed with water in proportions of two of cement to one part of water in a heavy steel tank. The tank was then closed and 150 lbs. of air pressure applied to force the grout through 250 feet of hose to each of the flap valves.

After the cement had been allowed to harden for two days, it was found that the undamaged compartments were then air tight and the water in them was readily expelled by compressed air. This furnished sufficient buoyancy to make it possible to lift the submarine with 8 large pontoons.

Commander Elsberg paid very high tribute to the morale, faithfulness and heroism of the personnel, especially the divers, who were all recruited from the enlisted men of the Navy. Commander Elsberg himself was frequently in diver's suit inspecting and directing the work in the submarine itself.

THE HOW, WHEN AND WHY OF WIRE ROPE

By Walter Voigtlander

EVERY engineer will subscribe to any reasonable method or policy that will reduce operating expenses at no sacrifice to efficiency. Naturally, the interest in such a method will be greatly increased when it is shown that the departure from standard practices will not only decrease expenses but simultaneously increase efficiency.

It would perhaps be improper to say that one part of a machine is more important than another part, since all parts are so interdependent that to give the full measure of service any machine must act as a unit. That wire rope is a major operating element in many machines will be agreed by all however, and it is the two-fold purpose of this article to show how a possible change in wire rope usage may both decrease operating expense and increase general over-all efficiency; and to present the best known methods for wire rope maintenance.

How to Measure Wire Rope

There is only one way to correctly measure wire rope and that is shown in contrast to the incorrect method by the accompanying illustration (plate No. 1). It is highly important that the proper size of rope be employed since an undersized rope will fail to give the degree of service that should reasonably be expected, while an oversized rope represents needless investment and will not properly operate over sheaves grooved for smaller ropes.

It is more important, however, to have the rope and the sheave properly fitted. Wire rope should not be allowed to travel over a sheave wherein the groove is too small for its diameter. A pinching sheave groove will do more damage to a wire rope in one hour than a properly sized groove in an entire week, or more. Sheaves grooved 1/16th of an inch larger than the diameter of the rope will lengthen the life of the rope several times as compared with rope life on pinching sheaves. Since sheaves are cheaper than good wire rope, there is small economy in continuing the operating of improperly grooved sheaves or drums. Also the tread diameter of sheaves or drums greatly affects rope life. Large diameter sheaves should be used wherever possible.

Uncoiling or Unreeling Wire Rope

Wire rope is ordinarily shipped and received either in coils or on reels. When uncoiling or unreeling wire rope it is very essential that no kinks are allowed to form. Once a kink is made, no amount of twisting or strain can take it out and the rope is unsafe for work. Never uncoil a wire rope as might be done with a rubber hose or manila hemp rope. Lift the coil to its edge and unroll the coil, allowing the rope to lie flat until used. Contrasting methods are shown in Plate No. 2. When wire rope is received on a reel it must never be taken off or "unreeled" as shown in the "wrong way" illustration, for such a method will invariably develop kinks and spoil the rope. If a jack-bracket for the coil is unavailable (as shown in Plate 2-A) turn the reel on edge and roll along the ground.

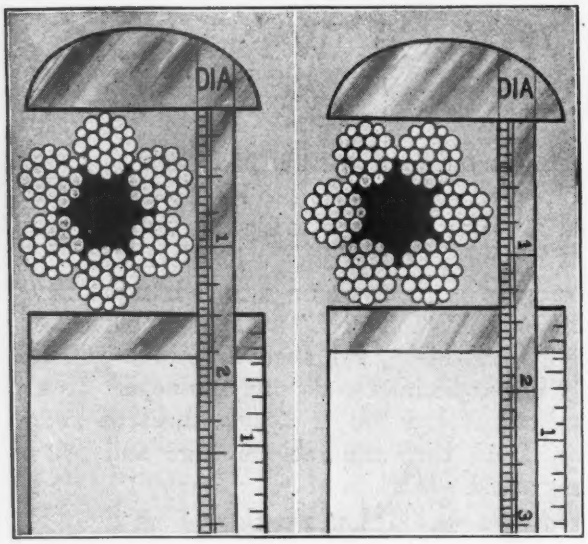
Lubrication

The cores of practically all good brands of wire rope, both the preformed and non-preformed types, are thoroughly impregnated with a commercial chemically-neutral rope oil. While the core retains a liberal supply of this lubricant, which gradually oozes out as the rope is used, still, frequent applications of a good lubricant during service are necessary to prevent the core from becoming dry. A dry core will both wear and crush more quickly than one that is thoroughly lubricated! It will also absorb moisture readily with the result that the core will deteriorate rapidly and the inner wires corrode. The smaller the sheaves or the heavier the tension on the rope, the more often should the rope be lubricated so as to prevent the too rapid wearing of the core in the first case and the excessive crushing in the latter case.

A good lubricant will retard corrosion of the wires, slacken deterioration of the core, reduce internal friction and decrease external wear. The lubricant should be thin enough to penetrate the strands and the core but not so thin as to run off the rope. Ordinarily, a thick semi-plastic compound applied *hot* (in a thinned condition) is best wherever possible. It will penetrate while hot, then cool to a plastic filler, thereby preventing the entrance of water. In this way the inner wires and core are both preserved and lubricated. To properly lubricate with a heated lubricant, it is necessary to have the rope run slowly through a tank of heated oil so that proper penetration is effected. Where this is not possible, an application of a thinner, unheated lubricant will give better practical results. It is always well to lubricate the rope just after the installation and before running in service, particularly if the ropes have been kept in storage for some time.

How to Splice Wire Rope

In order to prevent appreciable loss of strength at the splice, it is customary to make the length of splice not less than that given below for ropes of varying size:



Correct Incorrect

Plate No. 1. Illustrating by contrast the correct and incorrect method for measuring wire rope.

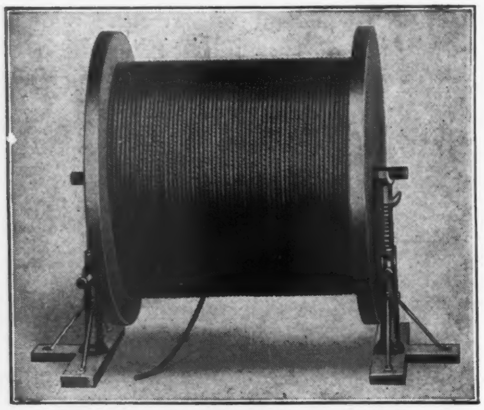


Plate No. 2-A. Jackbrackets provide the best possible means for unreeling wire rope. With this equipment there is little possibility for kinking.

Diameter of Rope	Length of Splice (feet)
½-inch	15
⅝-inch	20
¾-inch	24
⅞-inch	28
1-inch	32
1⅛-inch	36
1¼-inch	40
1½-inch	45

In splicing the two ropes, fasten the ends so that they overlap, allowing for a splice of from 15 to 45 feet as indicated by the above table. For purposes of explanation, we will assume a 30-foot splice. First, wrap or tie the ropes securely with iron wire 30 feet from each end, then unlay all strands 15 feet as shown in figure 2, cutting away the hemp core to permit bringing the two unstranded ends together so that the strands will interlock as in figure 3.

Take strand *a* and unlay it until the wire binding is reached, and in the open groove place strand A. Lay A in tightly as shown in figure 4, making the twist agree exactly with the twist of the open groove. Proceed in this way until all except two

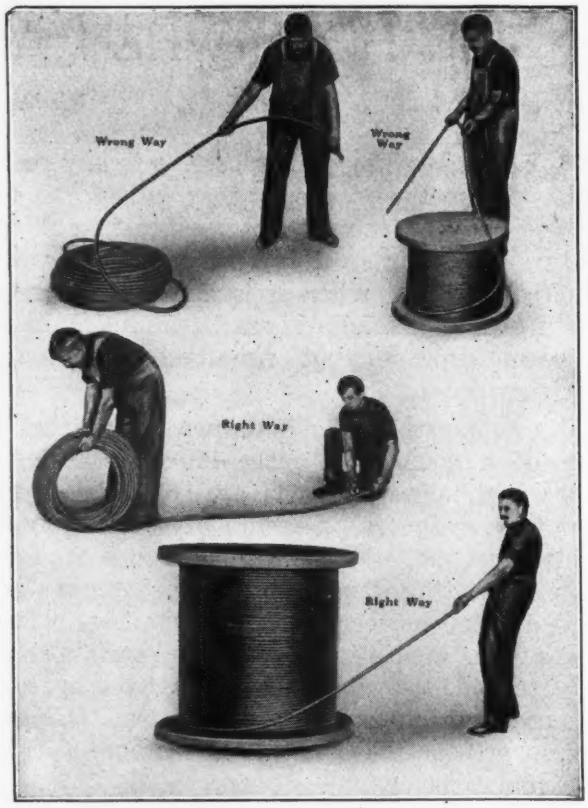


Plate No. 2. How to and how not to handle wire rope

feet of A are laid in and then cut off *a* and A, leaving the ends about two feet long. Now unlay strand B in the opposite end and in its place put strand *b*, stopping the end of the rope in the corresponding position to A, Figure 4. Subsequently *c* will be replaced by C, but this should be stopped six feet short of the junction of A and *a*, as shown in Figure 5. Similarly, D should be replaced by *d*, and the end stopped six feet short of Bb. Proceed similarly with Ee and Ff, stopping the ends six feet short of Cc and Dd respectively.

The rope will now present the appearance shown in figure 5, and the only remaining step is to tuck in the ends in such a way that the diameter of the rope will not be enlarged where the ends are tucked in. This is done by removing the hemp center and putting the ends of the strands in the place previously occupied by the hemp. To do this, it is first necessary to open up or untwist the strands of Aa so that the hemp center can be seized with a pair of pliers and pulled out. Then a marline spike is inserted under the two strands nearest the loose end of the rope, and after starting the loose end into the space left vacant by the hemp center, rotate the marline spike so as to force the strand into place. Repeat this operation at Bb, Cc, Dd, Ee and Ff and hammer the rope lightly with a wooden or copper mallet to give the rope a uniform diameter.

Seizing

The end of an ordinary wire rope should have at least three seizings to prevent unlaying, which if it occurs, would render the rope useless. The seizings may be replaced by fittings if they prevent

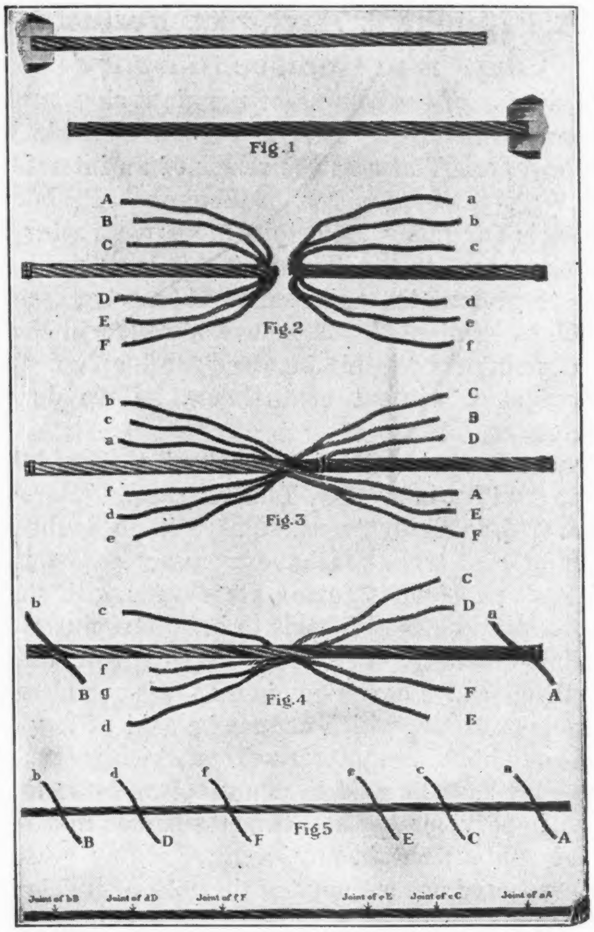


Plate No. 3. Illustrating the method for splicing wire rope. For details see text of article.

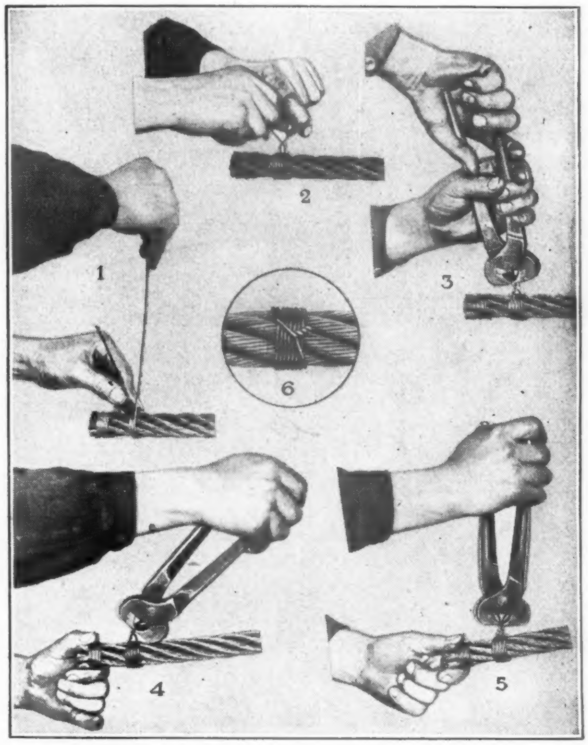


Plate No. 4. Illustrated here is the proper method of seizing wire rope.

unlaying of the rope. Annealed iron wire should be wound tightly in a close helix around the rope.

1—Wind the seizing wire on the rope by hand, keeping the coil together and considerable tension on the wire; winding over from left to right as in figure one of Plate No. 4.

2—Twist the ends of the wire together counter-clockwise by hand so that the twisted portion of the wires is near the middle of the seizing.

3—Using Carew cutters, tighten the twist just enough to take up the slack. Do not try to tighten the seizing by twisting.

4—Tighten the seizing by prying the twist away from the axis of the rope with the cutters, as indicated in figure 4.

5—Tighten the twist again as in No. 3. Repeat 4 and 5 as often as is necessary to make the seizing tight. Cut off the ends of the wires and pound the twist flat against the rope.

6—The appearance of the finished seizing is shown in figure 6.

Any annealed low carbon steel may be used for seizings, the size of wire ranging from No. 10 to No. 18, depending upon the diameter of the rope. This method is taken from the United States Government Master Specifications No. 297.

Socketing Wire Rope

There is generally a right and a wrong way to do any job. It has been found that the following method of socketing, and as illustrated in Plate No. 5, gives the strongest and most uniform results. Measure back from the end of the rope a distance equal to the length of the tapered basket of the socket. Tie securely at this point with soft iron annealed wire and add two additional tie wires below the first. Open up the strands as in figure 1, and cut out the hemp core as far down toward the tire wire as possible. Unlay each wire and straighten so as to form a brush as in figure 2. On large ropes, it would be necessary to use a small pipe over each wire to straighten or approximately remove the curl from the wire. If the wire is very greasy, hold the brush over a pail of gasoline with wires down and wipe off the grease with waste or paint brush dipped into the gasoline.

Dip the "brush" holding the wires point down, into a pot of muriatic acid solution (50 per cent water, 50 per cent commercial acid). Insert to a depth so as to *not* immerse the end of the hemp core. Keep in the acid until the wires are clean. Still holding the wires down, withdraw from the acid and knock the rope sharply with a stick (broomstick or hammer handle).

Place a temporary tie wire, as in figure 3, over the ends of the "brush," taking care not to handle the cleaned wires with greasy hands or tools. Insert the rope end into the socket and cut the temporary tie wire. Set the rope vertically in a vise; set the socket so that the wires come flush with the top of the basket of the stocket with wires spread out; seal the bottom of the stocket with clay or asbestos as in figure 4. If cold, warm the socket slightly.

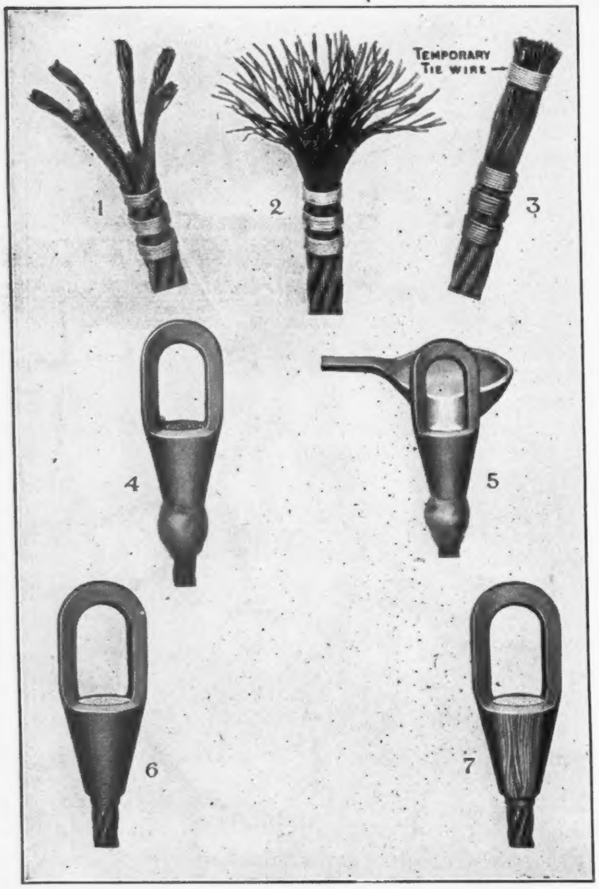


Plate No. 5. How to resocket wire rope. Accompanying text gives full details of each successive step.

Pour with pure zinc (not babbit, lead or other alloy) as in figure 5. Tap the side of the socket with light hammer while the zinc is still fluid, so as to jar the zinc into the crevices between the wires. When cool, remove the fire clay and the serving wires, and the joint as per figure 6 will result. It will help slightly in the flowing of the zinc among the wires to put a small quantity of salamoniac crystals over the wires just prior to pouring the zinc. Figure 7 shows a phantom view of the zinc cone with imbedded wires.

There is no business or industry that has lowered its production costs to the irreducible minimum, and until this has been done, the greatest amount of profit cannot be realized. Reduction of operating costs rests as much, if not more, in the smaller details than in the major items of equipment. No superintendent ever contracts for a large investment without serious consideration. This is as it should be, but there are some who do not give proportional consideration to the minor items of equipment, notwithstanding that in the aggregate they represent a far greater investment than the larger single items. Only by paying constant attention to the little things can we hope to write larger figures on the right side of the ledger at the end of the year.

Employees are less efficient and are more subject to accidents when they are in a low state of health.

A Prominent Architect Predicts Glass Will Replace Masonry

Prediction of the coming of the giant skyscraper composed entirely of steel and glass is made by the New York Times as the result of an interview with William Orr Ludlow, of Ludlow & Peabody, architects for many important modern structures. The masonry construction which is now used in order to present the appearance of massive security will be eliminated. This development will come when architects "think in steel" and accept the look of steel without concealment as we do in bridges.

"There is the aesthetic opportunity offered by building with glass," Mr. Ludlow says. "Here a new world opens up to us. There is no doubt in my mind that when we have properly solved the designer's problem of fusing glass walls with steel construction, we shall be able to build structures of the utmost beauty. One great advantage of glass, even the glass we have now, is that it is completely impervious to air, which cannot be said of any of the opaque building materials from which we make walls. We may be able to manufacture glass that is also impervious to the heat of summer and the cold of winter; but in any event, I see no reason why we should not employ the thermos principle in our buildings—vacuum spaces between double layers of glass walls. This would bring incalculable results in comfort and economy."

Home Building Figures For 1926 May Break All Records

Last year's unprecedented record of home building may be surpassed, according to a statement of the homes division of the Indiana Limestone Company. Half a million homes were erected in 1925. If the pace continues, a new record will be established.

"For the last few years," the homes division states, "the monthly average has risen, reaching the high figure of approximately $250,000,000 for 1925. Based on reports of the first six months, this year will show an even larger monthly average. Greatest activity is recorded in cities of 25,000 population and less and in cities between 200,000 and 500,000 population. More money has been available in the family exchequer for the comforts and luxuries of life in late years. Higher standards of living are fast eliminating the disease swept tenement, and shack town is becoming a ghost of the past. Everywhere tumbled down residential districts are being rejuvenated."

Accidents are expensive. Unhealthy workers are expensive. Hence there is an increasing tendency on the part of executives to reduce the amount of poor health and low vitality among employees.

PRODUCTION OF STONE INCREASED IN 1925

Production of stone in the United States in 1925, exclusive of stone manufactured into lime, cement, and abrasive materials, or crushed into sand, amounted to more than 114,310,000 short tons, valued at about $171,420,000, according to a preliminary compilation of reports from producers made by the Bureau of Mines, Department of Commerce. The figures indicate an increase of about 11 per cent over the 1924 production figure of 103,184,120 short tons. Final figures for 1925 production may be somewhat greater than the preliminary figures.

Stone sold as building stone, curbing, crushed stone, flux and refractories increased in quantity and stone sold as monumental stone, paving blocks, and flagstone decreased. The total of stone sold for rubble, riprap, manufacturing industries, and miscellaneous uses is estimated as somewhat more than in 1924.

Building Stone

The building stone sold amounted to 30,115,000 cubic feet—6 per cent more than in 1924. This includes stone for architectural work and relatively low-priced stone for rough construction, such as foundations, bridges, and unshaped face stone for buildings and retaining walls.

More than one-half of the building stone sold was limestone, about 15,760,000 cubic feet, the sales of which were 9 per cent more than in 1924. The largest quarry center for building limestone, the Bedford-Bloomington district in Indiana, reported sales of 11,803,890 cubic feet in 1925, an increase of 7 per cent over 1924. There was also an increase in the sales of high grade building limestone quarried at Russellville, Ala., Leuders, Tex., and the districts in Minnesota covered by Mankato, Mantorville, Kasota, and Winona, total sales from which were 331,000 cubic feet, valued at $593,000. Sales of limestone for rough construction also increased.

Total sales of granite for building stone (about 7,608,000 cubic feet, valued at $6,283,000), represented nearly one-fourth of the building stone produced in 1925, and an increase of about 11 per cent over 1924. The granite sold for architectural work, including rough and dressed stone, was approximately 2,163,000 cubic feet, valued at $5,560,000, an increase in quantity of about 30 per cent over 1924. Stone sold for rough construction also showed increased sales. The principal states producing granite for architectural building stone were Massachusetts (461,410 cubic feet), Maine (394,000 cubic feet), New Hampshire (169,500 cubic feet), California (177,700 cubic feet), North Carolina (125,000 cubic feet), Minnesota (93,750 cubic feet), and Connecticut (85,200 cubic feet). Pennsylvania, Maryland, Massachusetts, and Maine produced a considerable quantity of stone for rough construction work.

Total sales of sandstone for building (3,028,000 cubic feet, valued at $2,644,000) decreased about 15 per cent in quantity. Sandstone for architectural work, including rough, sawed, and finished stone, amounted to 2,328,000 cubic feet, valued at $2,580,000, an increase in quantity of 10 per cent. Ohio produced 1,491,000 cubic feet, and New York 302,000 cubic feet. Kentucky, Pennsylvania, Washington, Massachusetts, and other states also reported considerable amounts.

Marble sold for building stone in 1925 amounted to 2,864,000 cubic feet, valued at $9,600,000, an increase of 10 per cent in quantity. The principal states producing building marble are Tennessee (785,320 cubic feet), Missouri (782,920 cubic feet), Vermont (761,600 cubic feet), and Georgia (191,540 cubic feet). Alabama, Alaska, Arkansas, California, Colorado, Maryland, Massachusetts, New Jersey, New York, North Carolina, Pennsylvania, and Utah also furnish marble for building purposes. The product from Georgia and Missouri is chiefly for exterior building and that from Tennessee and Vermont for interior work. Serpentine (67,370 cubic feet, valued at $502,248) quarried in Maryland, Massachusetts, New Jersey, Pennsylvania, and Vermont is included in the marble figures. There was also sold 9,130 short tons of serpentine, valued at $49,357, chiefly for stucco and terrazzo work. The total sales of marble reported from Carthage, Mo., for 1925, were 517,020 cubic feet, valued at $1,098,251, an increase in quantity of 12 per cent over 1924. This includes a small quantity of monumental stone. Marble quarried at Phenix, Mo., chiefly for interior building work, amounted to 191,630 cubic feet in 1925. Basalt and various miscellaneous varieties of stone used chiefly for rough construction showed increased output for 1925.

Monumental and Memorial Stone

Stone sold for monumental and memorial work in 1925 amounted to about 4,361,000 cubic feet, valued at $14,330,000, a decrease of about 8 per cent in quantity. Granite (including rough and dressed stone) reported as sold for this purpose was 3,185,000 cubic feet, valued at $10,730,000, a decrease of 10 per cent in quantity. The principal states producing granite for monumental work in 1925 were Vermont (1,187,760 cubic feet, of which the Barre district produced 981,650 cubic feet), Massachusetts (385,520 cubic feet, of which the Quincy district produced 311,120 cubic feet), Minnesota (260,730 cubic feet), Maine (159,440 cubic feet), Rhode Island (166,770 cubic feet), New Hampshire (147,470 cubic feet),

Stone sold or used by producers in the United States, 1924 and 1925, by uses

Use	1924 Quantity	1924 Value	1925 Quantity	1925 Value
Building ....cubic feet	28,352,380	$33,175,656	30,115,000	$34,687,000
Approximate equivalent in ....short tons	2,211,750	....	2,400,000	....
Monumental stone.cubic feet	4,750,980	15,305,386	4,361,000	14,330,000
Approximate equivalent in ....short tons	393,550	....	361,000	....
Paving blocks ......number	41,037,570	3,578,676	39,787,000	3,657,000
Approximate equivalent in ....short tons	375,860	....	362,000	....
Curbing ....cubic feet	3,815,850	3,468,821	4,936,000	4,310,000
Approximate equivalent in ....short tons	296,070	....	383,000	....
Flagging ....cubic feet	810,440	560,156	755,000	562,000
Approximate equivalent in ....short tons	59,840	....	56,000	....
Rubble ....short tons	864,790	1,160,258	880,000	1,200,000
Riprap ....short tons	3,265,130	3,634,439	3,300,000	3,700,000
Crushed stone ....short tons	68,198,440	73,861,576	75,110,000	80,120,000
Furnace flux (limestone and marble) ....short tons	19,690,490	15,839,868	22,634,000	17,100,000
Refractory stone (ganister, mica schist, and dolomite) ....short tons	1,093,940	1,389,413	1,224,000	1,554,000
Manufacturing industries (limestone and marble) ....short tons	4,733,770	4,410,559	5,000,000	4,800,000
Other uses (chiefly agricultural limestone).short tons	2,000,490	5,485,305	2,600,000	5,400,000
Total (quantities approximate, in short tons)....	103,184,120	$161,870,113	114,310,000	$171,420,000

Georgia (109,720 cubic feet), Wisconsin (117,154 cubic feet), and California (124,200 cubic feet).

Sales of marble for monumental work (including rough and finished stone) in 1925 were reported as 1,176,000 cubic feet, valued at $3,600,000, a decrease of 4 per cent in quantity. Vermont produced 624,250 cubic feet, Georgia 394,930 cubic feet, and Alabama, Arkansas, Massachusetts, Missouri, New York, North Carolina, and Tennessee much smaller amounts.

Street and Road Work and Concrete

Street and road material in general showed increased sales in 1925, although sales of paving blocks (39,787,000 blocks, valued at $3,657,000) decreased 3 per cent in quantity, and stone sold for flagstones (755,000 cubic feet, valued at $562,000) decreased 7 per cent. Stone sold for curbing (4,936,000 cubic feet, valued at $4,310,000) increased 29 per cent in quantity. Total crushed stone amounted to about 75,110,000 short tons, valued at $80,120,000 in 1925, an increase of 10 per cent in quantity, although final figures may show a somewhat higher percentage of increase. Crushed stone for concrete and road work (62,420,000 tons, valued at $69,750,000) increased 8 per cent in quantity, and crushed stone reported as used for railroad ballast (12,690,000 tons, valued at $10,370,000) increased about 20 per cent.

Fluxing Stone

Stone sold for fluxing to blast furnaces, open hearth steel works, smelters, and other metallurgical plants, amounted to about 22,634,000 short tons, valued at $17,100,000, an increase of 15 per cent in quantity.

Refractory Stone

Stone reported for refractory use, which includes dolomite, quartzite, and mica schist, amounted to 1,224,000 short tons, valued at $1,554,000, in 1925, an increase in quantity of 12 per cent. Raw dolomite reported as sold for the manufacture of refractories in 1925 amounted to 415,710 short tons, valued at $381,215. Besides this quantity, operators who both quarry and dead-burn or sinter dolomite reported 392,145 tons of sintered material, valued at $3,730,509. The quantity of raw dolomite reported was 35 per cent more than in 1924, and the sintered material increased 19 per cent. Quartzite (ganister) used in the manufacture of refractory brick, for furnace lining, and for the manufacture of ferro-silicon, amounted to 769,690 short tons, valued at $1,018,385. This was an increase of 2 per cent in quantity. Sales of mica schist for furnace and kiln lining, which is quarried in Montgomery County, Pa., near Edge Hill, amounted to 38,600 tons, valued at $154,400, an increase in quantity of 36 per cent.

Sales in 1925 of pulverized limestone for agricultural use amounted to about 1,970,000 tons, valued at $2,300,000, an increase of 46 per cent in quantity over the sales for 1924. The accompanying table shows the estimated sales of stone in 1925 by uses and the sales for 1924 for comparison.

Newberry Company Operates Flexible Dredging Unit

White River, famous for its sand and in good repute because of its gravel for the Indianapolis market, is being worked by the Newberry Washed Sand and Gravel Company near Newberry, Indiana. This company started on a small scale, purchasing only what machinery was absolutely necessary for the work, but it has expanded rapidly and has kept pace with its growth by improving its plant structure and by installing more machinery. Plans are now under way for still further additions.

The deposit which runs along either side of the White River for more than a half mile is practically all under water although there is a good bar in the river at the extreme south end of the deposit which comes above the surface. The proportion of sand and gravel varies widely in different sections of the deposit, running as high as 70 per cent gravel and as low as 40 per cent. The gravel is of an unusually high test according to road building specifications. There is a very good grade of locomotive sand available here, and this is being produced by the company in proportion to the demand. The other grades of sand which are easily obtainable at but little expense are especially fine for concrete and masonry wall work. Although the Big Four railroad runs through the town of Newberry, there is no switch track to the plant and all shipments must leave the premises by trucks.

The material is dug from the river bottom sometimes to a depth of fifty feet by a slack line cableway equipped with a ¾ yard Pioneer bucket. A Mundy two drum hoist pulls the bucket over a 1⅛ inch track line to the washing and screening plant. The bucket line and tension line are each ⅝ of an inch in diameter. Power for this operation is derived from a 10x12 Mundy hoisting engine. The bucket empties into a steel lined hopper which has an elevation of 25 degrees. The hopper is adjacent to the main mast of the cableway which is of native timber and is 78 feet high. The hopper itself is elevated 40 feet to supply gravity for all the screening and loading processes. Water is poured into the hopper by a 5 inch Fairbanks-Morse centrifugal pump. The oversized material is rejected by a 5 inch gravity screen placed at an angle of 45 degrees. It falls to a pile at one side of the screening structure where a crusher will be put in as soon as the quantity demands. At present this material is being wasted.

The water and the material which pass this screen fall to a 3x6 feet screen with $\frac{3}{16}$ inch openings. That which passes over the screen is chuted to a 100 yards capacity storage bin for gravel. The material washed through goes to another screen 3x1½ feet with ⅛ inch openings, set at an angle of 55 degrees. That which passes over it is chuted to a 30 yards storage bin, and that which is washed through is chuted directly into an open storage stock pile. In this way the company produces a good clean grade of concrete sand and a good grade of fine sand for masonry work. Loading is done from the bins by gravity.

Mobility is one of the features of the plant. The washer is so constructed that the hopper may be moved in any direction and so kept directly under the cableway bucket at almost any angle. This makes it possible to work over the river bar for a distance of 500 feet without moving the mast or guys. The engine and supply house is built around the hoist in sections in such a way that it can be taken down with ease and moved whenever it becomes necessary to move the mast. The pump which is required to convey the washing water a combined vertical and horizontal distance of 100 feet gets its power from a Fordson tractor. S. E. Moore is president of the company and Alvin E. Keller, secretary-treasurer and superintendent of operations.

Production of Asbestos in 1925 Increased

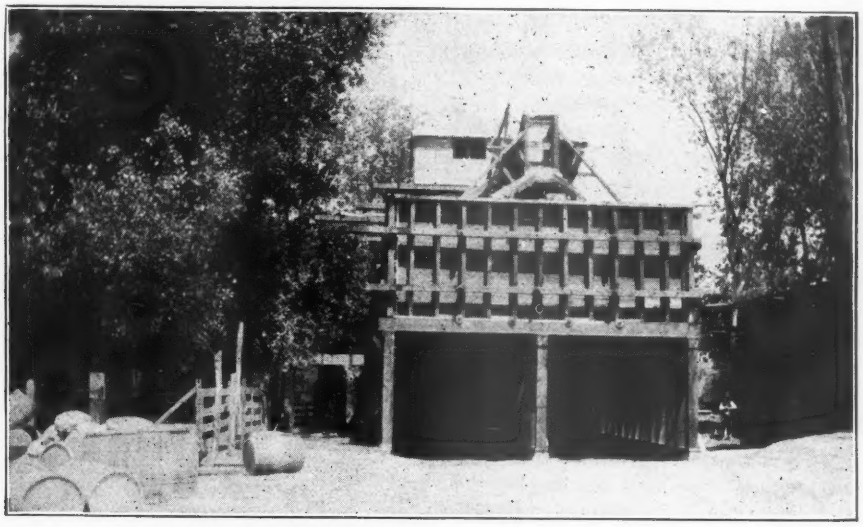
The total quantity and value of asbestos mined in the United States and sold in 1925, as reported by producers to the Bureau of Mines, amounted to 1,258 short tons, valued at $51,700. These figures comprise 93 tons of chrysotile asbestos, valued at $40,750, mined in Arizona and California, and 1,165 tons of amphibole asbestos, valued at $10,950, mined in Georgia, Idaho, and Maryland.

The sales of chrysotile asbestos showed a decrease of 46 per cent in quantity and an increase of 20 per cent in value, compared with 1924, and the sales of amphibole asbestos were more than 9 times as great in quantity and were 28 per cent greater in value.

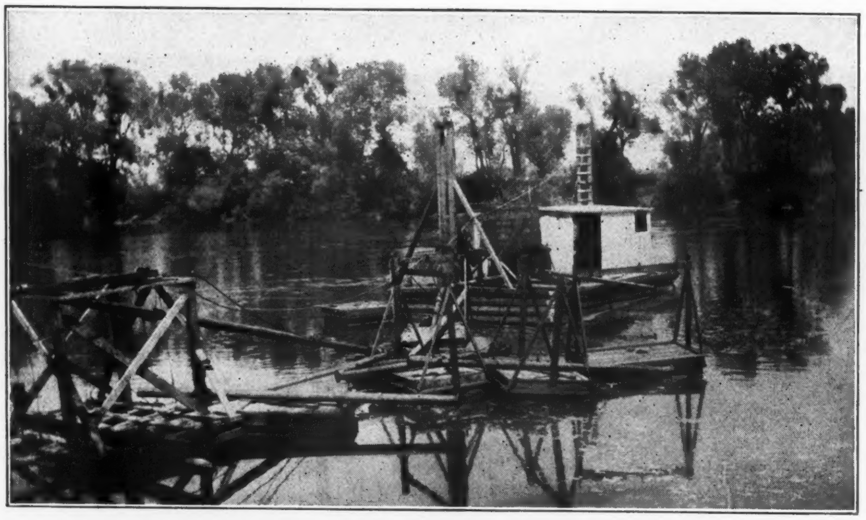
AN EFFICIENT SACRAMENTO DREDGING PLANT

An interesting sand dredge plant called the Sacramento Mortar-Sand Company is operated in Sacramento, California, by Harry and Herbert Simpson. The operation is under the direction of Will Thomas who believes the suction pump is superior to any other method of reclaiming wet sand. Mr. Thomas who is a student of all methods of operation, is always on the alert for new ideas and anxious to see or read descriptions of any plant where the method of operation approaches his. The center of the plant is a 7 inch centrifugal pump with a capacity of 60 tons an hour placed on a barge. Everything on the barge is electrically operated, and the boat is lighted by tapping the 440 volt operating current line and placing 110 volt globes in series.

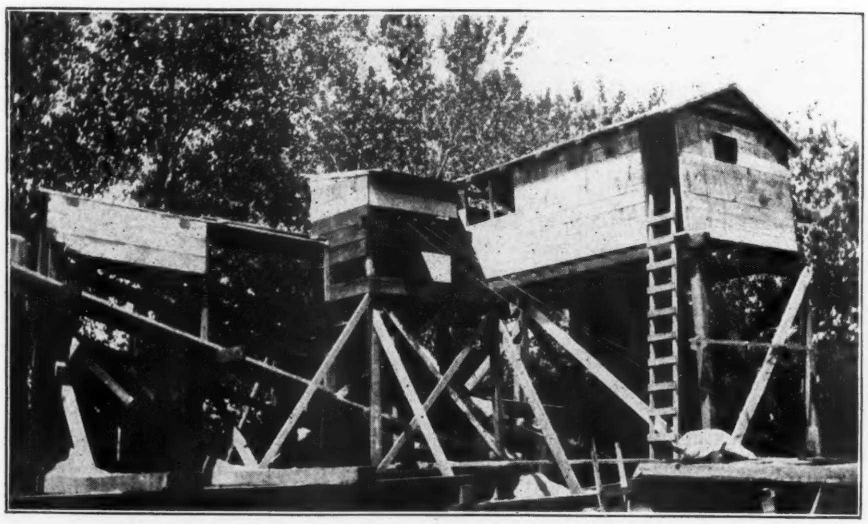
The 7 inch centrifugal pump is equipped with a 1 inch vacuum pump for priming and a 2 inch centrifugal is used for pumping out the barge and for filling the large water tanks used for sealing the big pump. The 2 inch pump is also used with a 2 inch ejector as an auxiliary priming pump. All switches and automatic controls for the pumps are located on a central board within easy reach of one man. The sand is sucked from a depth of about 20 feet, and the discharge pipe is carried to the river bank by barrel pontoons. On shore it is discharged into a large screening box and passes from there into a settling tank. Sand is taken from this tank through a circular disc valve and carried to bunkers by a bucket elevator. The bunkers have a capacity of 500 yards. All shipments are made by truck as the plant is not situated on a railroad and the market is local. The loading of these trucks is a very efficient operation. A five yard truck is filled by gravity in about half a minute.



Storage Bin With Eight Chutes On Each Side



Barge and Dredge



The House Above the Storage Bins

The Webster Roll Crusher

The Webster Manufacturing Company has recently issued catalog number 44, describing their roll crushers. This machine is built in single and double roll types, is simple in design and ruggedly constructed so that it will withstand severe service. Run of mine can be reduced to any required size in one operation, and the machine can be adjusted to change the size of product while in operation.

The crusher is provided with springs which automatically permit lateral adjustment of the crusher rolls to prevent damage in case any foreign material enters the rolls along with the product to be crushed. Two types of crusher rolls are furnished with these machines; solid cast iron or steel with plain or chilled teeth, or if desired those made with a cast iron spider on which are mounted cast steel segments with manganese steel breaker teeth. Drives for the machine can be arranged directly connected to motor, either by gears or belt.

The bulletin has also drawings of the two types of crushers with tables which supply prices, dimensions, capacities and weights. This information is of value to those contemplating installation and motor capacity required.

HAUSE FINDS UNDERWATER STORAGE ECONOMICAL

STARTING in 1924 as a teaming operation, the Hause Washed Gravel Company, of Asbury Park, New Jersey, have developed a small but modern and efficient plant. It has a market for all the gravel it can produce, disposes of a goodly quantity of sand and is again laying plans for expansion. The history of the plant is one of progressive change. The bed lies at the edge of the town. The land is level and the deposit is 22 feet deep, 10 feet of which lie below the water level. The operation was started by excavating to the water level with teams and then installing a 4 inch Morris pump run by a Fordson.

When a sufficient pond had been created, the pump and Fordson were mounted on a barge. This rig up soon excavated enough material to make it possible to install a 6 inch Morris pump deriving its power from a Climax "Trustworthy" engine, directly connected. A short time later it became necessary to employ hydraulicking principles by installing a 3 inch jet pump to play a stream of water on the bank to bring it down at a safe distance. In this manner the dry material in the bank was reclaimed wet and cleaned by the pumping process, the material being thoroughly agitated in passing through the pump and discharge line. The barge, which is comparatively small, is completely housed and has an A frame with block and tackle at the bow for moving the suction head. The material from the artificially made pond is pumped to stationary screens where two sizes, ¾ inch and ⅜ inch, are separated and lifted to storage bins by a Haiss bucket elevator. When these bins are full, the discharge spout into which the bucket elevator empties is shifted, and the material is sent to open storage.

The Hause Dredge

The finer materials, which passes through the screens previously mentioned, is returned to the pond for under water storage. This is of particular advantage here because the demand for sand is not always steady, and it avoids the difficulties of open storage of damp material and their reclamation in this state. When the sand is needed, the 4 inch pump, first used in the operation and later replaced by a larger model, is brought into play. The sand is pumped to the top of the bins where a half inch screen rejects the larger sized pebbles, a ¼ inch screen throws out the grits, and a Telsmith sand separator reclaims the sand. This separator discharges in the open, but the material is generally loaded immediately as only enough is pumped from the pond to meet the present demand.

The Screening and Storage Plant

Loading from open storage and from the sand separator is done by a clam shell bucket and a stiff leg derrick placed so that it is within reach of all storage places. The bins load by gravity chutes into trucks. As there is enough demand in the surrounding territory for the product, the Hause company does not ship by rail. The plant has a capacity of 300 tons daily and employs five men. F. E. Hause is the principal in the company.

New Power Transmission Catalog Issued

A new catalogue, brimful of power transmission and engineering information has just been issued by The Hill Clutch Machine & Foundry Company. This catalog number twenty-six, is printed in three sections A, B and C.

Section 26-A illustrates and describes a new flexible coupling of unique simplicity, flanged and compression coupling, shafting and bearings. A large part of this section is devoted to the illustration and description of the "Cleveland Type" oil film bearing, in which the rotating shaft or journal is supported without metallic contact, on a nearly frictionless film of oil. Complete data is given on a heavy duty form of this bearing, in which bearing temperatures, due either to external heat or high speed and heavy pressures, are controlled by cooling the lubricating oil with a circulating water cooling system. Another item in this section is an improved type of clamp for securing bearings to structural steel without the necessity of drilling holes.

Section 26-B covers fully the application of the patented "Smith Type" Hill clutch pulleys and cut-off couplings including quill drives. A complete horse-power table is presented from which friction clutch or plain pulleys may be chosen to meet any requirements. Full data and dimension tables enable the designer to incorporate any of the standard forms of "Smith Type" Hill clutches in power transmission layouts. Following pages take up transmission of power by belting, giving formulas and tables covering the horse-power of leather belting. Applications of belt tighteners to secure maximum horsepower transmitted are discussed in detail. The application of the new "Steelarm" automatic belt tightener, which provides means of scientifically controlling belt slip, will be of interest to engineers and power transmission men in many industries.

Section 26-C illustrates and describes both American and English systems of rope drives; agitator designs, parts and gearing; "Forged-Cast," iron cast tooth, and cut spur and bevel gears; "Industrial Type" speed transformers; and a wealth of pertinent engineering data such as bolt strengths and dimensions, pipe dimensions, threads and tap drills, sheet and wire gauges, fusion temperatures, tables of allowable loads on structural shapes, concrete data, trigonometric functions, areas and circumferences of circles, etc.

The three sections of catalog No. 26 have a total of 258 pages, and are substantially bound. Each section is profusely illustrated and line drawings of individual products furnish controlling dimensions of all sizes.

Trained Horses Help Johnson

Maximum production for its equipment and working force is secured by the A. P. Johnson Sand and Gravel Company of Larned, Kansas. This firm conducts a dredging operation in the Arkansas river and produces a mixed sand and gravel for building purposes which meets the demands of the local trade because of its size and cleanliness. Engine sand for railroads and road gravel are also products of the plant.

The deposit in this section of the Arkansas river is known for its high quality and is in good demand. Mr. Johnson, who operates the plant himself with one assistant, loads directly from his screen to trucks or railroad cars, and by reason of his spur track from the Wichita and Northwestern railroad is able to ship over the Santa Fe and the Missouri Pacific as well as by the first mentioned route. He has a loading capacity of 750 tons in a ten hour day.

A river barge houses a six inch Amsco steel pump which was put in three years ago after a year of trouble with a four inch cast iron pump. Mud balls and rocks clogged operation of the smaller pump but the 6 inch Amsco does the work satisfactorily. The pump is run by a 60 horse power General Electric motor. Electricity is purchased from the Larned city power plant. The sand is pumped from a depth of 27 feet and carried through a six inch discharge line supported by pontoon boats and scaffolding. The discharge line runs about 200 feet to the grader on the river bank which has its top 28 feet above the water level. As the barge moves up and down the river the line is lengthened or shortened as needed by adding or removing sections of pipe.

As not all the product is graded some is pumped directly into cars placed in front of the grading structure. The method of spotting these cars is most interesting. The cars are put on the sloping spur by the railroad and are moved about by means of a winch and cable operated by electricity. Frequently the ground man was too busy at the discharge end of the pipe to handle the team. They were too far away for the human voice to carry successfully. Here Mr. Johnson's ingenuity came into play. He trained the team of horses which do the work to respond to a whistle. They are so used to the whistle now that they respond almost unfailingly. They can move ten cars of sand at one time.

The grader into which the elevated discharge pipe empties is a flat screen. So far there has been no demand which would necessitate the installation of a rotary screen but Mr. Johnson is ambitious for his business and hopes to be able to enlarge and improve his operation considerably within a short time. The screen discharges three ways, to cars, to a 75 ton bin or to open storage. The bin serves the local trade and is kept full at all times.

Use A Crimper

Ignorant and careless handling of blasting caps kill and maim hundreds of persons every year. Many a workman has crippled himself for life in biting the cap on the fuse and others have filled themselves with copper or have been killed outright by the sparks from their hat lamps or pipes dropping in an open box of caps. Lots of blasters continue to bite the caps on the fuse and think that because they have never exploded them they never will. But some day they will lose something, besides teeth. It is much easier, and lots safer, to use a crimper, a tool made for the purpose. Accidently stepping on a cap will often result in a mangled foot. Sparks, flame, heat, blows, friction—all serve to explode the cap to which they are applied. When a blasting cap goes off it does great damage locally and it is very seldom that nobody is injured.

Why Engine Wear Depends on Lubrication

By G. S. Hamilton

All automobile users know that a properly lubricated car is quieter and more satisfactory in its operation. Care in this respect will be repaid many times over by the long life of the motor. The same holds true for the heavy-duty, industrial engine used on cranes, shovels, locomotives, etc.

Where two moving parts are perfectly lubricated there is no wear because they do not come in contact with each other—but are separated by a thin film of oil. This is a condition that we would like to find in all of our industrial engines. There are many things that make this degree of perfection hard to attain, but the correct oil, properly used, will provide very safe protection against wear. Proper use is essential, for no matter how good the oil may be when it is put in, careless operation may destroy its value.

If the engine is run intermittently —only for a short time daily—it is quite likely that the engine will never get hot enough to work at its best efficiency. This means that the gasoline will never completely vaporize, but that some of the liquid fuel will pass by the pistons and mix with the lubricating oil. Oil that has been too much thinned down by this dilution does not have the necessary strength to separate the moving parts of the engine and protect them against wear.

When working under dusty conditions, the air which is drawn into the engine through the carburetor carries with it quite a quantity of grit and abrasive material. If this is carried to excess, the oil is contaminated, and becomes to some extent a grinding compound instead of a lubricant.

If the correct oil is used in your engine and is changed often enough to keep out the abrasives, and if the engine is kept hot enough to guard against excessive dilution, at the end of two years service it will be a very much better engine. Play safe, change the oil in your engine every fifty working hours, and keep down excessive wear.

Roberts and Schaefer Take Over Car Dumper Company

On July 15th, Roberts and Schaefer Company entered upon the manufacture and sale of rotary car dumpers, car feeders, car controls and all other equipment previously manufactured and sold by the Car Dumper and Equipment Company, which company has been taken over by Roberts and Schaefer Company including all patents, drawings, patterns, etc.

The Roberts and Schaefer Company will carry on this business even on a larger scale than did the Car Dumper and Equipment Company. The Roberts and Schaefer Company have retained Mr. George N. Simpson, president of the Car Dumper and Equipment Company, to handle the new department and they are prepared to furnish repair parts for any equipment previously sold.

The Roberts and Schaefer Company are also organized to build complete crushed stone and sand and gravel plants. They also manufacture screens and their new "Arms Vibrating Screen" has just been introduced to the market.

Recent Patents

1,587,621. Process of conditioning sand for foundry use. George Walther, Montgomery county, Ohio, assignor to Dayton Steel Foundry Co., Dayton, Ohio.

1,587,769. Pulverizing - machine. Dudley T. Fisher, Columbus, Ohio.

1,588,253. Method of treating limestone. Frank C. Mathers and Herman T. Briscoe, Bloomington, Ind.; said Briscoe assignor to said Mathers.

1,591,378. Pneumatic conveyor for molding sand. Charles C. Hansen, Easton, Pa., assignor to Ingersoll-Rand Co., Jersey City, N. J.

Rain Is the Life of This Dredging Plant

A VERY heavy rain brings more granite gravel to the dredge of the Industrial Sand and Gravel Corporation in West Cache creek near Lawton, Oklahoma. From the Wichita mountains, three miles to the north, an excellent grade of clean sharp building sand and gravel is washed down to the dredge by high water. In this way the mountain comes to Mohammed. The deposit in Cache creek runs from fifteen to thirty feet in thickness and as there is practically no overburden stripping is unnecessary. Large boulders are the chief problem.

The working bed of the deposit is more than a mile and a half long and from an eighth to a quarter of a mile in width. The barge on which the pumping machinery is set is 40 feet long by 20 feet wide. A Swintek traveling screen suction nozzle with a 35 foot ladder and driven by a 15 h.p. Wagner motor directly connected is mounted on the side of the barge. This is supported on the outside by a 7x40 barge. These two barges are bolted together with heavy timbers, thus making them one for operating purposes.

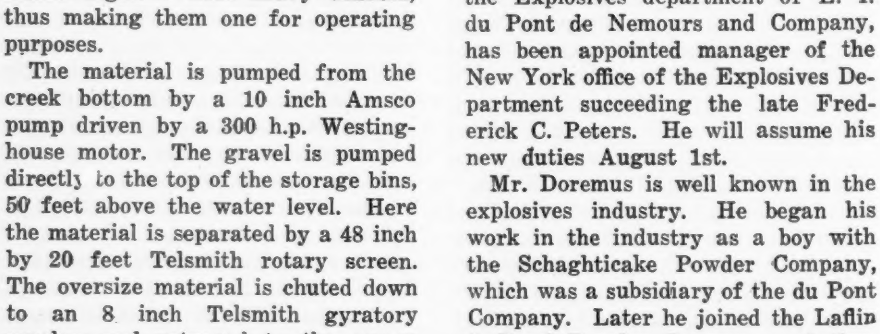
The material is pumped from the creek bottom by a 10 inch Amsco pump driven by a 300 h.p. Westinghouse motor. The gravel is pumped directly to the top of the storage bins, 50 feet above the water level. Here the material is separated by a 48 inch by 20 feet Telsmith rotary screen. The oversize material is chuted down to an 8 inch Telsmith gyratory crusher and returned to the screen by a Telsmith bucket elevator. The sand is dewatered in two settling tanks.

The surplus sand is stocked by a clam shell bucket working on a 115 foot guy derrick having a 100 foot boom swing. This same derrick reloads the sand from stock to railroad cars. Practically all shipping is by rail.

In connection with the Swintek this company uses a 15 h.p. directly connected pump and motor discharging through the hydraulic nozzle at the suction end of the Swintek. This causes an increase in saving and has increased production. Dynamite is used occasionally to loosen the deposit. The charge is exploded about 10 feet under water at the edge of the bank.

A second plant was installed to produce unwashed pit run material for railroad ballast. This ballast material is being sold to the Frisco railroad. At present this plant is being operated by a two yard Sauerman Crescent scraper but it is planned to convert it into a slack line cableway plant as additional capacity is needed.

The capacity of the plants is 300 cubic yards a day each. The material runs 55 per cent rock and 45 per cent sharp sand. The officers of the company are: E. B. Dunlap, president; H. B. Roth, vice-president and general manager; Harry Langheim, treasurer; J. C. McClure, secretary. All these men are residents of Lawton.



The Industrial Sand and Gravel Layout

Doremus Goes to New York

T. E. Doremus, at present manager of the Seattle, Washington, office of the Explosives department of E. I. du Pont de Nemours and Company, has been appointed manager of the New York office of the Explosives Department succeeding the late Frederick C. Peters. He will assume his new duties August 1st.

Mr. Doremus is well known in the explosives industry. He began his work in the industry as a boy with the Schaghticake Powder Company, which was a subsidiary of the du Pont Company. Later he joined the Laflin & Rand Powder Company and then came with the du Pont Company in a clerical capacity. He served a number of years as assistant manager and manager of the Sporting Powder Division.

When the Dyes department organized its foreign sales department, he became its representative in China and put this branch of the industry on a working basis, gaining for himself valuable experience in the export trade. He was recalled from China to take charge of the Seattle office

The Anderson Type K. D. Diesel Engine

The Anderson Engine and Foundry Company has recently issued Catalog thirty-four, describing the Diesel engines which they manufacture. These engines are made in the largest plant in America, devoted exclusively to the manufacture of oil engines, and are designed mechanically simple and will operate on a variety of cheap by-product fuels.

The heavier, or lower grades of fuel oil not only have a higher heat and power content, but are sold cheaper per gallon. The catalog states that these engines have been designed to use these cheaper fuels. The engines are built to fill practically every stationary power need, whether it be for direct connection or for belt work. Large factors of safety have been used throughout with the engine details of suitable strength.

To insure long life, the working parts on the engine run unusually slow, it does not get its power from high speed. Piston speeds are well within the limits of standard practice and good engineering. The engines are tested at considerable overload and conservatively rated at 1,000 feet altitude, and guaranteed to operate safely and successfully under certain overload in continuous operation.

The r.p.m. is such that they run at synchronous speeds, thus enabling them to be direct connected to standard stock generators. The governor and fuel injection is such that a change of speed may be obtained at any time desired, while the engine is in operation. Rotation may be in either direction, and can be changed at any time by a simple adjustment, requiring but a few minutes.

The engines are equipped with two symmetrically designed, accurately balanced flywheels, of sufficient weight to insure steady operation. The flywheel design and regulation is such that these engines are suitable for belting or direct connection to generators for electric light service. The two flywheels distribute the weight equally on the crank shaft, on the bearings and on the foundation, and permit driving from either or both sides. The crank shaft has generous bearings and is forged from a single billet of open-hearth steel, heat treated and oil tempered, after which it is accurately machined.

Similar good design and workmanship is followed on all the elements used to build the engines. Ten different sizes of units are built, ranging from 50 to 360 horsepower, the smaller sizes having one cylinder and increasing to 2, 3, 4 and 6.

The Lorain 75

The Thew Shovel Company has recently issued a catalog describing the Lorain 75 shovel, crane and dragline which they manufacture. This machine is a 1¼ yard and is made to be either gasoline or electrically operated. It has a great range due to the boom design. The position of the shipper shaft in the boom permits a given length of boom and stick to dump higher and dig farther than previously designed machines. The mechanism is simple, one shaft, one pinion and a driving sprocket.

The turntable is made on a different plan, a single power unit, three power shafts driven by one pinion. The boom construction is light, strong and gives maximum reaching ability. The center drive truck is that introduced in 1924 and has proven sound and reliable in service, showing that its principle and construction are correct.

The Lorain 75 is a complete machine—shovel and crane, designed throughout for both purposes. It is built to be operated with either a gasoline motor or electric power unit. The gasoline power unit is a 4 cylinder heavy duty engine, guaranteed to develop 81 horsepower at 850 r.p.m. It is governed to maintain this speed at full load. Throttle control is also provided to reduce speed for idling. Twin disc clutch on the engine drive shaft permits disconnecting power unit from the operating mechanism. The fuel tank is located in a recess in the bed plate, with vacuum reed system to the engine. The flywheel is equipped with ring gear for ready attachment of starting equipment.

The electric power unit is a 40 to 50 horsepower motor and can be furnished for any current specifications in the lower voltages. Automatic push button starting equipment controls motor from operator's station. Current is plugged in at the track, and collector rings on the truck, and brushes on the turntable, transmit the current to the motor. All wiring is in conduit and proper protection is provided against overload.

The Lorain 75 offers an arrangement of levers and mechanism whereby the transmission of power and its application to the work is accomplished with the greatest ease. This is by means of three hand levers and a foot brake for the crane or shovel. One hand lever and the foot brake control the main hoist drum, the second hand lever controls the two swing clutches which rotate the turntable in opposite directions; the third hand lever controls, through two clutches, a two speed reversing shaft which operates the travel, boom hoist and dipper crowd motions. These motions may be operated independently or combined as necessary. The dipper crowd can be utilized to aid the truck travel, and the travel motion can be instantly reversed, giving absolute control on grades.

Belnap Now Heads Worthington

Mr. L. J. Belnap has just been elected President of the Worthington Pump and Machinery Corporation following a meeting of the Board of Directors. Mr. C. Philip Coleman, retiring President, was elected Chairman of the Board. Mr. Belnap was formerly President of Rolls-Royce of America and Chairman of Wills-St. Claire Company of Detroit.

Allen Returns to Chicago

Jean M. Allen has returned to Chicago and established offices at 2047 McCormick Building. He was recently with the Reynolds Dredging Company of New Orleans. He has severed his connection with this company and will now devote his personal attention to dredging machinery and sand and gravel plants.

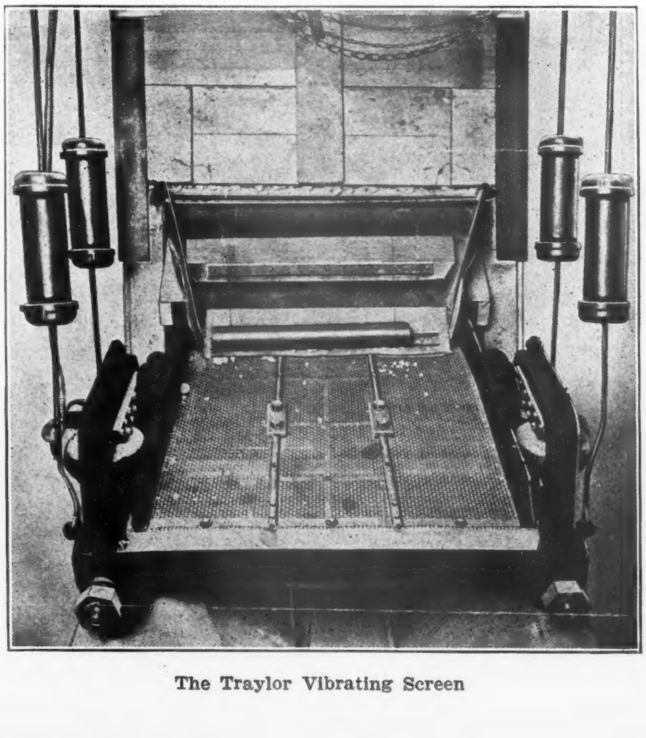
Traylor "Screen Supreme"

The Traylor Vibrator Company has recently issued a circular describing the screen, known as the "Screen Supreme" which they manufacture. It is claimed that this screen possesses a maximum of efficiency, capacity, economy, simplicity and accessibility with a minimum of space, power consumption, noise and upkeep adjustments.

It is electrically operated, possesses uniform vibration, screens material either wet or dry, requires no oil or grease and is designed so that it has no bearings. The throwing of a switch places the screen in operation. The machine is built very compact, is easy to install and requires very little power for its operation, one commercial type screen, under ordinary conditions, requiring only ½ h.p. for the maximum load. One interesting feature is the lack of noise in its operation. This is due to the elimination of striking or bumper blocks, the absence of bearings or cams and the use of direct electrical power. Special built starters and armatures for mixed alternating and direct current power, with armatures assembled on spring steel tension rods, are the basis for the perfect uniform vibration of the screen.

Enclosed shock absorbers eliminate the vibration between the screen and super-structure or screen platform supports, and as there are no moving parts, pulleys or belts to be operated, a heavy construction is not necessary. The screen is designed to operate on 110, 220 or 440 volt, 60 cycle, alternating current together with an A. C. motor, D. C. generator set of small capacity. The approximate weight is 750 pounds.

This company also manufactures a Laboratory "Screen Supreme." This has been designed to fill the need of a quiet, light and efficient screening unit. It is light, weighing only 20 pounds, and is compact, length 14½ inches, width 6 inches and height 9¾ inches. It operates on 110 volt alternating current light circuit and may be transported from one place to another, allowing precision testing and laboratory screening to be done in the field, as well as in the laboratory. The screen is practically noiseless and has four magnitudes of vibration. By turning an indicator the desired vibration may be obtained. This assures the most efficient results in sizing materials regardless of the nature of the material. Testing sieves may be obtained to meet any particular requirements.

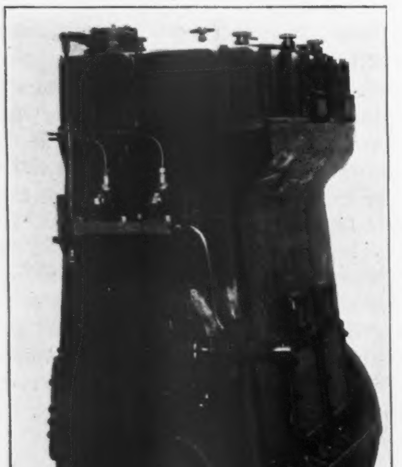


The Traylor Vibrating Screen

NEW FOOS DIESEL ENGINE

A Diesel engine with many new and distinctive features has been brought out by the Foos Gas Engine Company to meet the specific requirements of the industrial field. On account of the great economy of the Diesel engine as compared with the gasoline engine there has been a demand for a Diesel unit of such characteristics as would make possible its installation in industrial uses; such as power shovels and cranes, industrial locomotives, pumps, generators, etc.

While it would be desirable to have a Diesel engine of approximately the physical proportion and weight of the gasoline units now extensively used, it is not feasible to attempt this duplication. The operating characteristics of a Diesel engine are such as to require more substantial construction, and in order to assure the fabrication of an engine that will have long lived possibilities it is necessary to allow for generous bearing surfaces and cooling volumes.



The New Foos Engine

An exterior inspection of this new engine does not identify it as a Diesel engine since it is entirely enclosed and no moving part is visible. For an engine that is to be the power unit of the general industrial field, the complete enclosure feature is one of great value. To operate successfully in such equipment, any engine should be completely protected from dust and dirt or any foreign matter that might get into the bearings and other working parts. It is obvious that the complete enclosure of the engine saves it from the danger of having tools or other heavy masses falling into the working parts. Complete enclosure has still another advantage in that it confines the lubricating oil that is circulated through the engine, it being impossible for the lubricant to leak from any part of the new unit.

While completely enclosed, the new engine is yet accessible. Large cover plates are provided on both sides, opposite the crank throws, which give access to the lower part of the main cylinder frame, and the top of the engine is provided with cover plates that may be lifted up for inspection of the heads, the valves and the valve mechanism.

The Foos industrial diesel follows in general detail the practices that have been followed in the construction of other Foos Units. It is a four cycle engine and operates on the full-Diesel combustion cycle. A cross section of the engine indicates a plain Diesel combustion chamber; in other words, the head is perfectly flat, there being no recesses or precombustion chamber, vertically, at the axis of the cylinder. Complete atomization of the fuel is secured by the mechanical injection principle that has been successfully used in the case of the large stationary Foos Diesel unit.

Four valves are provided in each head, two for exhaust and two for inlet. At the level of the head of the main box frame, which houses the entire unit, a recess in the casting provides the air inlet manifold, and, the air inlet valves are located in the head adjacent to the front side of the engine. Passage way through the main box frame at the back of the engine is provided for the exhaust gases to enter into an exhaust header. For the valve operation, a cam-shaft runs full length of the engine at the level of the cylinder heads, the camshaft drive being by means of a silent chain driven directly from the crank shaft.

The entire valve arrangement is very simple and accessible. It is arranged that any of the valves or the valve lever proper may be removed without disturbing any other portion of the mechanism. This simplicity is essential since the engine will be called upon to operate in the hands of engineers that may not have experience in the operation of Diesel units. Even the flywheel of the new engine is enclosed, operating in a bell housing. All of the fuel pumps and the governor are completely housed, giving them the same protection as is offered the other main working parts of the engine. Lubrication of the engine has been taken care of in a very efficient manner. A central lubricating oil system furnishes oil to every bearing in the engine under pressure. In the lower part of the bed plates a trough is provided where the lubricating oil is collected. An oil pump picks up the lubricant, puts it under pressure and distributes it to all the bearings of the engine. Not a single oil cup or grease cup is found on the unit.

In order to get a Diesel engine down to a low enough weight per horsepower to make it practical for installation on mobile or semi-mobile machinery, a high speed engine is necessary. The new Foos industrial diesel has an operating speed from 400 to 900 r.p.m. Tests made at the factory indicate that complete combustion is secured throughout this entire range using low grades of fuel oil. The design of the sprays and the fuel system as a whole is such as permits the use of oils having a low gravity. Having such a wide range of speed, extends the flexibility of the engine, making its use particularly convenient where direct drive is employed. Engines of a rating as low as 45 h.p. and as high as 475 h.p. are possible with the one cylinder size and the established range of speed.

General Electric Build New Generators

Two new direct-current generators and exciters have recently been developed by the General Electric Company and are described in Bulletins G. E. A. 432 and 433. The generator described in the former bulletin is known as Type CD and built in sizes from 2 to 100 k.w. They are recommended for general service and for excitation of synchronous machines. The standard speed ratings are 1750, 1150, 900, 750 and 575 r.p.m.

The machines are furnished for belt drive, and the belt tension may be quickly adjusted without change of alignment, by turning a screw. Without modification, any generator may be used with an automatic voltage regulator, or a manually operated field rheostat for control of d.c. voltage. The generator is especially designed to give stable operation and steady voltage conditions down to one-third of rated voltage. A large 50-point field rheostat is furnished with each generator. Due to stable operation of the field generator at low voltage, this field rheostat will give all necessary voltage control when the generator is used for excitation of a synchronous motor

The latter bulletin or G. E. A. 433 also describes direct current generators and exciters, but built in smaller sizes known as type BL

AN IMPROVED CABLEWAY HOIST

An improved type of power unit designed especially for operating the largest sizes of slackline cableway excavators is announced by Sauerman Brothers. It is an electric unit powered by a two-speed motor and resembles a standard Sauerman two-speed electric cableway hoist in many respects, its chief distinguishing feature being that the drum clutches are operated by compressed air through air rams mounted at the ends of the drum shafts.

The first of these large power units was installed at a sand and gravel plant located on a bay along the Atlantic coast where it operates a 3½ cubic yard Sauerman slackline bucket. The track cable on which the bucket travels is 350 feet long and spans a natural sump in the bottom of the bay in front of the plant. This sump is a receiving point for sand and gravel brought in by bottom dump barges from dredging operations in distant parts of the bay. The Sauerman slackline cableway is called upon to reclaim this sand and gravel to the plant at the rate of 300 tons an hour.

To assure the proper line speeds and power for handling the 3½ cubic yard bucket at the rate of 50 round trips an hour and produce the tonnage above mentioned requires a 250 h.p. hoist, and necessarily it must be of massive construction. It weighs 20 tons, is over 15 feet long, 11 feet wide, including operator's platform, and stands over 6 feet high. But for all its massive size, one man is able to operate it all day long without fatigue, because manipulation of the clutches is rendered so easy by the system of air controls.

The operator is stationed on a platform built out from the hoist bed frame at the front right-hand corner, where he has the clearest vision of the work. Three small air controllers, similar to locomotive air brake valves, control all the friction clutches. Two levers operate the three valves as two of the valves are interconnected and operated by a single lever. These controllers are designed to give a graduated application, so that any degree of application of the clutches can be made from the off position to full reservoir pressure. An electric motor driven compressor supplies air to the controls. A pressure gauge for each controller is provided on a panel in front of the operator, to show the air pressure in the rams at any position of the controller handle. The drum brakes are operated by foot levers.

All drum clutches are of the heavy outside band type, lined with asbestos material. All the gearing is of steel with teeth machined from solid blanks. The drive from the motor is through a silent chain, totally enclosed in a steel plate housing and running in a bath of oil—a noiseless drive of the highest efficiency. The entire hoist is mounted on a heavy structural steel bed frame, closed at both ends, providing a strong construction and a design that resists distortion.

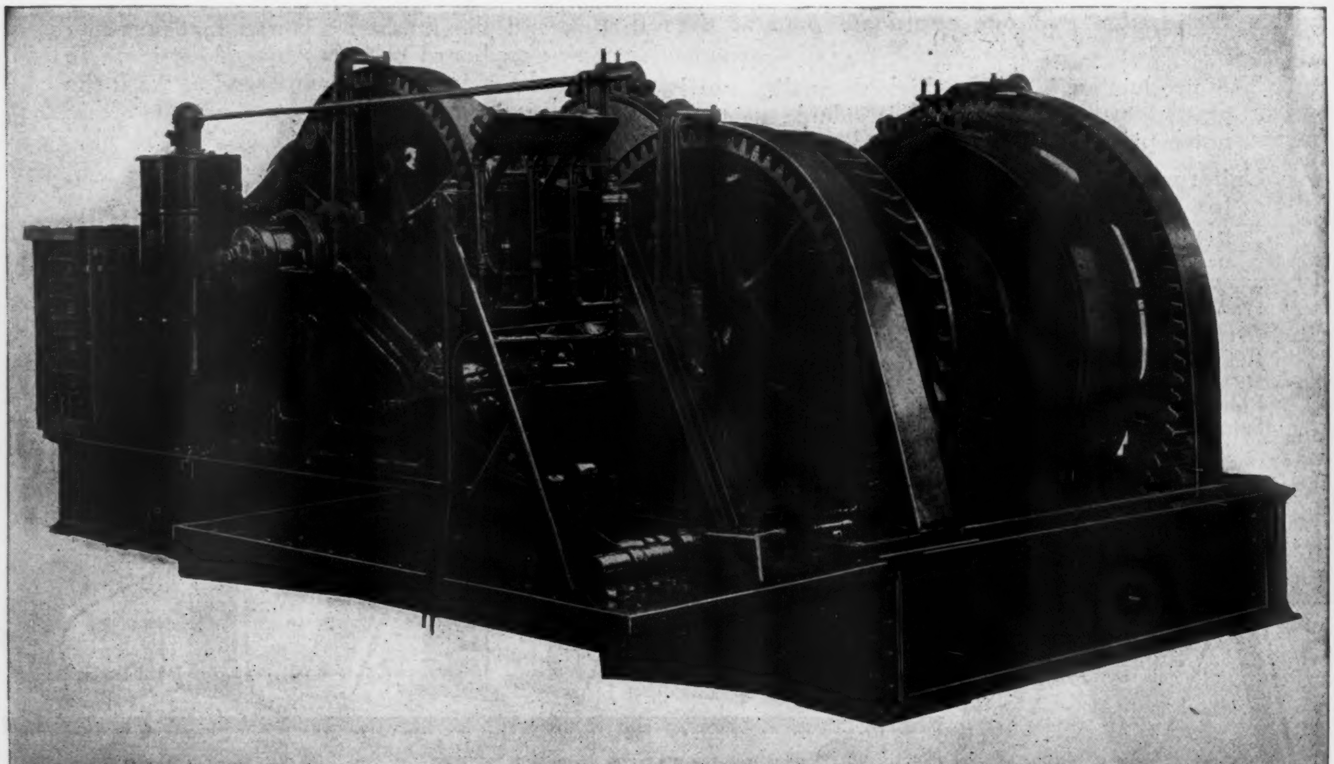
Galion Belt Conveyor

The Galion belt conveyor is made especially for the purpose of loading sand, gravel, crushed stone or slag from hopper bottom cars or a grizzley hopper to trucks. The manufacturers claim that the saving in demurrage charges will soon pay for the new machine, a combination belt conveyor, car unloader and truck loader.

The machine is steady and strongly built for durability and heavy work. It is claimed it will load a five ton truck in less than two minutes and will give years of satisfactory service. The automatic force feed relieves the belt of the wear resulting when material is dumped directly from the car onto the belt. A special clutch enables the operator to disengage the power from the force feed instantly.

Harnischfeger Notes

The Harnischfeger Corporation announces the appointment of H. S. Beale as sales engineer in New York territory with offices at 50 Church Street, New York. Mr. H. A. Wolcott, formerly in charge of the Miami office, has been made district manager of the New York territory with headquarters at 50 Church Street, N. Y.



The Photograph Does Not Give a True Idea of the Great Size of This Powerful Machine. It Weighs 20 Tons, Is Over 15 Ft. Long, 11 Ft. Wide Including Platform and Stands Over 6 Ft. High.

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